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MONOCULAR DIPLOPIA WITHOUT MANIFEST LESIONS OF THE AFFECTED EYE.

BY ROBERT TILLEY, M.D., CHICAGO, ILL.

Read before the Chicago Medical Society.

In the month of October, 1881, James E. Adams, of London, England, brought before the Ophthalmological Society of Great Britain and Ireland the subject of uniocular diplopia. The question was confined to the existence of the phenomenon in the absence of any abnormal condition of the iris, lens, vitreous, fundus or any marked error of refraction of the affected eye, the question resolving itself into this, is it possible for an eye, not the subject of any manifest deformity to project two images of one object? or are two mental conceptions possible from one impression on the retina?

Mr. Adam's attention was directed to the subject in connection with a suit for damages against a railroad company by a "hysterical woman." This occurred in the Spring of same year, 1881, the symptoms said to have existed in the case were "insensibility, coming on half an hour after an alleged railroad

injury, lasting for three or four days, followed by vomiting, then convulsions, then convergent strabismus lasting for some weeks."

At the time of examination by M. Adams "both eyes were normal in all respects, the excursions of each separately, were perfect and all the associated movements equally good. She declared that with the right eye she saw two distinct images of a pencil held at twenty inches, separated by an interval of some inches and on the same plane."

He further adds that he has since seen a little boy with a high degree of myopia who claimed to be the subject of the same phenomenon. It is definitely stated, however, that this phenomenon was observed in the right eye only when the left was closed. No statement is made, however, as to whether the closure of the non-affected eye in the woman's case was necessary to develop the phenomenon. The boy is said to have perceived images of double the number of small objects such as coins that were placed before him, only, however, when the left eye was closed. Mr. Adams, erroneously I think, supposed that with a prism placed base upwards or downwards before the non-affected eye the boy should have, if he were not simulating, seen three objects instead of two.

He sums up his remarks by saying that "up to the present time (1881) he had never met with a case in which uniocular diplopia, in an eye that was physically perfect, was alleged to exist except under circumstances where there was strong ground for doubting the validity of the patient's statements." It would have been pertinent to have asked if Mr. Adams had ever before seen a case in which uniocular diplopia was claimed without lesion of the affected eye.

He further states that after the receipt of the claimed damages she speedily recovered, but the statement is too indefinite to be of any scientific value. He does not say that he saw and examined the woman, nor does he refer to anyone else who did.

At the same meeting of the society Dr. W. M. Ord narrated

in full two cases of uniocular diplopia. The one case, a man of twenty-eight, may be subject to a certain amount of doubt, and apart from other cases would be of but small value. But in consequence of the agreement of this case in certain particlars with other cases in which there can scarcely exist a justifiable scepticism it is not without value for comparison.

In neither of the cases referred to by Mr. J. Adams is any mention made of external paralysis, in fact, we are assured in the one case that it did not exist, although according to the woman's claims it had existed and her statements coincide with the observations of others in later cases, and in the other we are justified in assuming that it did not exist at the time of observation.

In the first case mentioned by Dr. Ord we have the existence of paralysis or paresis of the external recti distinctly stated.

There is in this case no mention made of the condition of the iris, although in all probability the pupil was dilated. We are led to infer, although it is not stated in so many words that when both eyes were used he was the subject of ordinary diplopia arising from the feeble or paralised condition of the external recti, but no direct statement is made that he saw quadruple images. This is an important peculiarity. You will remember that the closure of the non-affected eye in the case of the boy referred to by Mr. Adams was necessary to the development of the phenomenon.

The second case reported by Dr. Ord was a school-boy, admitted to St. Thomas' Hospital September 3, 1879, 13 years of age. And strange to say the preliminary symptoms are in some respects very similar to the first case referred to by Mr. Adams. The boy, it is true, had an epileptic fit. He was quite unconscious. No general paralysis followed, but he remained drowsy, and for four days had constant vomiting, and both external recti acted imperfectly. There is no note made that the boy ever saw four images when both eyes were open, and there is no statement that he did not. The movements of the eyes caused pain and the pupils were widely dilated.

Mr. Nettleship, of St. Thomas' Hospital, also examined this boy and he says: "I began by simply disbelieving the boy's statements, but repeated and varied trials by others as well as myself left little doubt that at any rate the boy was sincere in his statements."

It will thus be recognized that the phenomenon, if it exists, is an unusually rare one and that it devolves upon anyone who presents a case to detail the most minute particulars.

This boy was again later admitted to the hospital, and was under Mr. MacCormac's care for an abscess on the back of the neck. Nothing was then known of his previous history. He died quite suddenly Nov. 20, 1880. The post-mortem examination revealed in the right cerebral hemisphere, in the normal position of the right lateral ventricle, an old blood clot, having a slight attachment at its lower surface. It was egg-shaped, about $2^1/_2$ inches long and one inch thick. A small aneurysm the size of a pea was found a quarter of an inch below the blood clot. The blood vessel connected with the blood clot but the lumen was closed with a continuation of the blood clot. This blood clot, practically a tumor, was distinct and separate from the right lateral ventricle, but it had displaced the ventricle considerably to the left; there was a half inch of tissue separating the space of the blood clot from the ventricle.

At the same meeting Dr. John Abercrombie reported a case which was under treatment at the hospital for sick children, Great Ormond St., in the month of July 1881. The previous history of two months gives a record of headache, vomiting, peculiarity of speech, loss of power on right side for two months, squint for three months, had chorea, no rheumatism, no convulsions. Mother died of cancer, father said to have had fits. One more child of the family "healthy."

The interesting feature for the present study is the existence when admitted to the hospital of paralysis of the right external rectus, slight internal strabismus of right eye, no ptosis. "Sees double with both eyes and also when right eye alone is used. The false image is always above and to the left of the true one. No mention made of the condition of pupils.

Optic discs obscure, right paler than left, veins in both eyes turgid and tortuous.

Dr. Abercrombie says: "During the next few days she was repeatedly examined with regard to the diplopia, but the result was always the same, viz, when the left eye was closed there was double vision, when the right eye was closed her sight was normal."

July 28, unconsciousness developed, slight convulsions, pulse very frequent, breathing irregular, eyes fixed, staring pupils moderately dilated—death.

The autopsy is so significant and the publication in which it appears so little circulated that I give it verbatim:

Autopsy 16½ hours after death. Body weighs 44½ pounds. Rigor mortis marked. Calvaria and dura mater natural. Convolutions flattened, especially in the right posterior region. Surface of brain dry and sticky; the two hemispheres adhere to each other; corpus callosum arched. Pia-mater at base rendered opaque by recent exudation of greenish lymph, a thin layer of which envelops pons Varolii, and causes gluing together of medulla oblongata and cerebellum. The exudation of lymph extends into each Sylvian fissure.

On cutting into the right hemisphere the white matter in the region of the temporo-sphenoidal and occipital lobes is found to be broken down and a large abscess cavity takes its place containing some ounces of laudable pus; the descending cornu of the lateral ventricle is filled with pus and leads directly into this abscess cavity; the lateral ventricles otherwise are dilated and filled with a thin slightly turbid fluid.

Left hemisphere, cerebellum, pons Varolii and medulla oblongata natural; right internal ear natural; left optic disc swollen, margins ill defined. Both lungs show slight hypostatic congestion. A little thickening of mitral valve. Alimentary canal, liver, spleen and kidneys normal. Some of the mesenteric glands a little enlarged and caseous."

Dr. Abercrombie adds there is not the least reason to suspect this child of malingering. She was examined on different occasions without anything occurring to lead us to doubt her

veracity. I think, therefore, we may accept it as a fact that she had double vision with the right eye.

In May 1884, Mr. Marcus Gunn and Dr. J. Anderson again brought the subject before the Ophthalmological Society, of Great Britain, with the presentation of another case, and on the the same occasion Dr. Brailey and Messrs. Juler and Nettleship referred in brief to cases under their care.

The case reported by Mr. Marcus Gunn and Dr. Anderson, was a painter, aged 34 years.

There was paresis of the left external rectus, there was the usual homonymous diplopia of abducens paralysis, but also double images with the left eye when the right eye was shut. Tension in both eyes normal, pupils unequal, left larger, both acted to light and accommodation. On looking upward the right globe made a slight excursion inward on its way, and when he looked to the left his right eye was directed very slightly upward as well as to the left. In other respects the movements of the eye were normal. There was no nystagmus. In other respects the left eye was normal—nothing visibly wrong in the cornea, aqueous, iris, lens, vitreous or fundus. Examination revealed the diplopia to exist over the left half of the field of vision and also over the upper part of the right half; the images got farther apart as the object neared the periphery. It was not possible to obtain the perception of three images by the aid of prisms. This patient was also examined by Dr. Nettleship. There was no reason to suspect the patient of simulation.

A detailed history of this case is given in the report. It involved so many nervous lesions that, although syphilis was denied on the part of the patient, and no demonstration of lesions could be made, he was subjected to anti-syphilitic treatment, and so far improved that the diplopia and the paralysis of the external rectus disappeared. He was still occasionally the subject of attacks of unconsciousness, which were called "fits."

The cases of Mr. Nettleship, Mr. Juler and Dr. Brailey were all associated with paresis of the external rectus and dilatation of the pupil.

I will now give the details of a case at present under my observation which gave rise to my presentation of the subject.

Mary R., 9 years, orphan, no family history obtainable. When she was brought to me her face presented an appearance of great distress, a suppliant expression; her step was cautious, as though she was afraid of jarring her head. The left eye was kept partially closed, not from ptosis, but from the action of the orbicularis muscle. She complained of severe pain in the infra-orbital region, greatly aggravated on pressure over the infra-orbital foramen. There was increased pain on even medium movements of the eye, so much so that she would move the head rather than the eye. The pain, apart from the infra-orbital region, was located rather in the region of the external rectus, and the position of the pulley of the superior oblique. There was no paralysis of any of the muscles demonstrable, and even paresis was very questionable. When the eyes were directed upward the left eye turned inward and the effort was associated with great distress. The difficulty of movement was rather indicative of a pain in the muscles, developed by an effort at contraction. There was a headache which, she said, came on every other day. There had been, and there was no other evidence of any malarial affection.

There was a very slight amount of conjunctivitis of the left eye only, no blepharitis, no other external lesion; cornea, aqueous, iris, lens and capsule, vitreous and fundus were all normal, and there was no detachment of the retina. There had been no complaint made about the right eye, nor did it present any lesion.

V. with both eyes together and each eye separately, $^{6}/_{18}$. N. V. S. o. 6. Pupils normal in every respect; contracts quickly under the influence of light, and normally on accommodation.

She persistently claims double vision with the left eye. On examining her the first time, suspecting some difficulty in the form of paresis of the muscles of the left eye, I asked her if she ever saw two objects instead of one. "With this eye I do," she said, pointing to the left. Quite sceptical, I proceeded to examine her statements.

When a probe was held vertically before her at a distance of 50 cm. she said she saw two, the extra image being projected toward the median line, and a little less clear. She pointed to its location definitely. When, however, the probe is held in a horizontal position, she located the extra image as above the object. The double images do not change their relative distances when moved toward the nasal or temporal sides, nor when the object is moved up or down, only the observation is less satisfactory on account of the discomfort associated with the efforts at movement.

However the experiment was varied, she invariably gave evidence of double vision with the one eye. When one, two or three coins were placed before her, she saw two, four or six.

It occurred to me to measure the relative distance of the extra image when looking at a near object and one that was more remote. Of course such a calculation would be a good check on the accuracy of her answer. The principle involved being that the distance of the extra image from the object at one metre should vary directly as the distance of the extra image at six metres. One measurement which I made before using atropine gave me a displacement of the extra image to the nasal half of visual field of .075 millimetres at a distance of one metre; and at six metres the displacement, according to her location, .400 millimetres. The theoretical distance on calculation would give .450. This I considered a corroboration of the girl's veracity, as the discrepancy could well be referred to inaccuracy in my crude measurements. It would have been impossible for a child of 9 years to have calculated so near in the absence of some actual sensation similar to what she claimed.

Atropine was applied to the eye, and observations were made two days later when the eye was fully atropinized, the pupils dilated *ad maximum*, and the accommodation completely inactive. The same answers were given to the same questions, only she now located the extra image as not only in the nasal and upper half of the field of vision, but as quite a good deal nearer to her than the object. This phenomenon was not

noted before the influence of the atropia. It was not definitely noted that it did not exist, but I think I should have noted the fact when measuring the distances of the extra images from the object, if she had thus seen it.

The vision of left eye, under the influence of atropia, required a lens S+1 D to restore the visual acuity that she had before, showing a slight amount of latent hypermetropia. With the s+1.00 D, however, vision was $^{6}/_{18}$ as before. No satisfactory explanation was obtained relative to the deficiency of visual acuity, whether it might be referred to retinal asthenopia or cortical asthenia.

The exact displacement of the extra image at one metre during the influences of the atropia was difficult because of the above-mentioned fact that the extra image was nearer to the eye than the object, but approximative measurements gave the distance at one metre to be .065 millimetres and at six metres the distance of the extra image was claimed to be .330 millimetres. Theoretical calculation would have .390 mm. It will be remembered that under atropia the extra image seemed less distant than the actual object when near objects were under observation, but the phenomena did not exist when looking at objects at a distance of six metres. It did not occur to me to inquire at what distance this phenomenon ceased to be observable.

Pursuing investigations further I found the girl to be completely red-blind. She has no conception of any difference between greens and grays ; and purple, blue and violet she puts together as similar colors.

The above observations were made at intervals between November 12, 1887, and December 4, 1887. On December 4, when in church, she felt that she could neither speak nor breathe and then she was unconscious. Convulsions followed which were said by the Sisters to have lasted for four hours. After a period of consciousness the convulsions were renewed the same night and said to have continued for a similar period. After this she felt pain all over the body. Confined to bed.

Dec. 8, at a consultation with Dr. D. W. Brower, Prof. of Ner-

vous and Mental diseases at the Woman's College, the double vision with the one eye was demonstrated. Dec. 13, has been frequently delirious since last record; cannot keep anything on the stomach. When delirious complains of pain on the top of the head. Buries her head as much as possible in the pillows. Pulse has varied from 60 to 75 and the temperature has scarcely varied from the normal. Dec. 15, has been very restless—slapped and tore the hair of her little attendant, all at once however, she became better. She slept well, complained of no pain, and ate her food, and the vomiting ceased. For the first time since she has been under my observation she can now look up without experiencing pain. There is no mydriasis, no lack of accommodation and no paralysis or paresis of the external ocular muscles.

She still sees double both with the two eyes open and with the left eye alone, the false image referred to the same position whether the right eye is open or closed. It is always in the nasal and upper half of the visual field. I could not get her to acknowledge any inclination of the images.

Dec. 23, she left the institution in charge of the sisters and the sister in charge reported, she seemed as well as ever but less active and less capable mentally.

Jan. 19, '88. As she did not return to school, I visited her at home. I found her afflicted with abscesses all over her body, some under the arms and on the forearm. The left eye was giving her no pain, but the double images were present, and a pain which she said was similar to the pain which she experienced in the left eye was appearing in the right eye.

As I do not expect to see her again, I close the report here. The etiology, pathology and location of the cerebral lesion are all involved in so much obscurity that I shall add only a few words.

The similarity of the main features of the case to the two cases above referred to made me suspect from the first time I saw the child the existence either of brain tumor or abscess. The location of the tumor or abscess, simply from the two autopsies referred to above, I referred to the right cerebral hemi-

sphere in such a position as to encroach on the lateral ventricle. I have no theory whatever to present relative to the possibility of double images under the circumstances. The development of convulsions and their persistence at intervals with the associated vomiting strengthened that opinion. The increased severity of the symptoms on the 14th, and the sudden improvement made me suspect an abscess and its rupture into the third ventricle. The development of abscesses over the body in about two weeks after the sudden improvement, made me suspect that these abscesses were of a metastatic character. As to the character of the primary abscess, I have not sufficient data to justify any conclusion, and the want of education on the part of the person now in charge of her precludes investigation.

CHRONIC (SIMPLE) GLAUCOMA.[1]

D. COGGIN, M.D., SALEM, MASS.

In the six months ending last January, it was my lot to see four patients having, what till recently was termed, *chronic simple glaucoma*, all of whom consented to have an iridectomy performed. Two submitted to a double operation.

As the symptoms did not vary materially in the four cases, the history of only one will be given—and that but briefly.

April 10, 1882.—Mr. L., æt. 63 years. Native born. Wheelwright.

Left eye—sight poor for years, and it now amounts to the counting of fingers, held to the left, at 50 centimetres. Pupil small and inactive. T + 1 (?) Atrophy with marked excavation of the optic nerve. No external signs of glaucoma in either eye.

[1]Read at the Annual Meeting of the American Ophthalmological Society at New London, July 21, 1887.

Right eye—V.=Sn. 18. at 4. +1.25=4. at 4. and with + 4.5 V.=Sn. .50 at .30.

Pupil and T. n. Has seen less well of late.

Rainbow-colors at night, when tired. No pain. Excavation of disc and bending of vessels. No spontaneous pulsation. Field of V. normal. Color sense not affected. Is of a nervous temperament. Is restless nights. Rarely drinks a little punch, and ordinarily smokes six mild cheroots daily. Regular living advised and potassium bromide and strychnia with acid phosphate were ordered, with the injunction to return at once if pain should appear in the eyes.

Two months later the left eye had become quite blind and it had at times been painful, which the instillation of an eserine solution relieved.

In January, 1886, the tension of the right eye seemed increased and the use of eserine was advised in that eye. Pupil not enlarged, but it responded sluggishly to light.

He read Sn. 5. at 4 metres with +1.75, and with +5. he could still make out Sn. .50.

A year later the vision had fallen away, and amounted to Sn. 6. at 4. (with +1.75). Field of vision contracted. Anterior chamber shallow.

The time had now come when operative interference seemed called for, with the idea of preserving the remaining sight.

In this, as well as in several other cases of simple glaucoma, eserine was apparently of no value in arresting the advance of the disease.

The advisability of doing a sclerotomy naturally occurred to me.

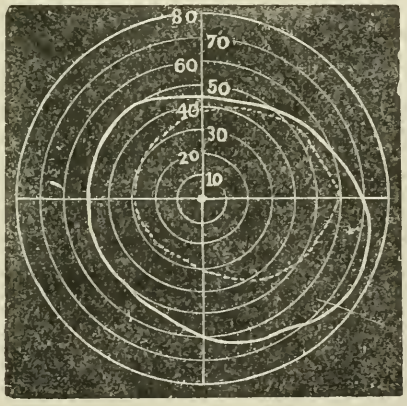
This operation (performed with a Graefe's knife in preference to a Wecker's sclerotome) had, five years before, been of some help in the case of an artist but, unfortunately, death occurred within a year, so the history of the case possesses no clinical value.

In the absence of pain, Badal's operation was not considered, and it was deemed best not to attempt that of Mr. Cowell, and it was finally determined to treat this case like one of

acute, or of chronic, glaucoma. An iridectomy was accordingly done, upward, on the 15th of last January. Cocaine was employed, and it produced nearly complete anæsthesia, the reverse having, in my experience, been the invariable rule in patients having acute or inflammatory glaucoma. Free hæmorrhage followed the incision through the cornea and the further steps of the operation were executed with difficulty.

On the following day the blood had so far disappeared as to show a small but satisfactory iridectomy and, also, a quite extensive dialysis of the iris, but separated from the coloboma.

(In a patient who underwent a double operation for the same trouble shortly before, the bleeding was so great that, after the absorption of the blood it was with chagrin that the iris was found to have been excised at a considerable distance from



its insertion and, as a possible result, nine months later, the central vision had fallen off one-half).

Two weeks after leaving the hospital Mr. L.'s right visual field was examined and its area is represented by the dotted line on the accompanying plate—the heavy white line indicating the (minimum) normal field of vision.

At the expiration of seven months it remained practically unchanged. Vision the same as before the operation. Photophobia, due to the artificial pupil, was complained of. T.n. (?).

The very trite history of this case of simple glaucoma is here offered, with the hope that it may evoke such an expression of opinion as will throw some light as to the most satisfactory course to follow in treating this not uncommon affection.

Without some sort of operative procedure there is, ordinarily, a progressive deterioration of sight.

For example, a man consulted me five years ago who presented the usual symptoms of simple glaucoma, but who positively declined an operation, although he was from time to time urged to submit to one.

At present he is blind.

Some years since a gentleman, whom I afterwards saw for a simple external trouble, consulted a practitioner on account of simple glaucoma. Alarmed because he was advised to have an operation done then and there, he sought advice of another surgeon who counseled delay. An iridectomy was not performed. The gentleman now has to be led about.

Further illustrative cases are scarcely called for. The question is—despite the accidents, possible visual disturbances, and, perhaps, further loss of sight, that noted authorities affirm may follow an iridectomy—does not the performance of this operation in simple glaucoma give to the patient a better expectation of retaining his remaining vision than can be hoped from any other method of treatment?

BRITISH MEDICAL ASSOCIATION—SECTION OF OPHTHALMOLOGY.

The following papers and reports are taken from the *British Medical Journal:*

W. A. McKeown on One Hundred Consecutive Cases of Cataract, Mature and Immature, Treated by Intra-ocular Injection.

The question of intra-ocular injection in the extraction of cataract, brought by me before the profession in 1884, has occupied so much attention, particularly on the Continent, that I embrace the opportunity now presented of stating my views and my most recent experience before the representatives of ophthalmology of various nationalities.

From the time I began the practice in 1884 till the present time, I have used intra-ocular injection in every case in which it was indicated. I have followed generally the lines laid down in my address to the Ophthalmological Section at Belfast in 1884. My views at that time are my views now. I have proceeded cautiously step by step, operating on cataracts less and less mature, until I have reached the practical point of extracting lenses which are sufficiently clear to admit of patients going safely about, but presenting too much opacity to enable them to follow their occupations. I consider it a blemish on ophthalmic surgery that patients with opacities of the lens requiring very many years to develop to anything like maturity, as hitherto understood, should be obliged to go about doing nothing, losing health, strength, spirit, and, if without means or helping friends, to become inmates of workhouses or private charitable institutions.

I purpose now presenting to you the statistics of the last 100 operations for cataract, of all degrees of maturity and immaturity, in which I used intra-ocular injection, and I would remind you that you have no analogous statistics. There is a large number of cases of striated cortex with clear triangles interspersed, and of cases in which the surgeon could see more or less the details of the fundus. All these would be re-

jected by the surgeon practising ordinary methods as unsuitable for operation.

Of the 100 cases there were 81 cases of idiopathic cataract uncomplicated, 5 complicated by affections of the eye or its appendages, and 14 traumatic. Of the 81, 13 patients before operation could see to go about, and could count fingers from two to fifteen feet, but had not been able to work for a considerable period, and the fundus could be seen with more or less distinctness; 9 had striated cortex with triangular areas transparent; making in all 22 of various degrees of immaturity. In the 81 cases there were 8 escapes of vitreous, all slight but one, and of these only 2 occurred during injection. The proportion of escapes of vitreous, though a little more than usual, has, therefore, no bearing on intra-ocular injection. As to the sequences of the 81 operations, there were:

1. One case of panophthalmitis occurring three weeks after operation. On the sixth day I opened the eye, expecting everything right, there having been no complaint. I found vitreous projecting in wound enclosed in unruptured hyaloid membrane. Bandage for two weeks having been continued without material improvement, I cut off projecting vitreous; panophthalmitis supervened. The operation had been perfect in every respect, and I think the prolapse occurred from some injury to the eye.

2. Three cases of pretty severe iritis; fair vision still remaining, and capable of improvement. One counts fingers at four feet, another at one foot, and another at six inches. The first was owing probably to syphilis and rheumatism, and the other two to impaction of iris in angle of wound.

3. Three cases of irido-cyclitis and choroiditis. *a.* One in case of patient (in whom double extraction was performed) who would not allow bandage to remain on for six days after operation. Fortunately, only one eye suffered, and when he left hospital the eye was quiet and field good. *b.* Another in case of old congenital cataract with thickened capsule in man, aged 30. Removed thickened capsule with forceps; vitreous began to come; used scoop syringe, as I have sometimes done

successfully in escape of vitreous, but in this instance was obliged to leave considerable part of lens behind. An iritis with a nodule of pus and inflammation of ciliary region developed after some weeks. Made a section; removed remains of lens with syringe with complete relief. Saw him lately, when I found eye perfectly quiet, perception of light good, and tension normal; but as other eye, also operated on, had good vision, I did not propose further operation. *c.* The third in case of man, aged 70, very nervous, and accustomed to stimulants in the morning, as I learned afterwards. Operation normal. On sixth day wound unhealthy, showing a slight focus of infiltration at one part of cornea, and a little pus in anterior chamber. Iris became involved; no pain. Treated by stimulants and hot steeping. Field of vision good, and could see bulk when I saw him a month ago. I have not seen him since, and cannot give further particulars.

Having entered into these details regarding the whole 81 cases, I shall refer in particular to the 13 very unripe cataracts.

Case I.—Female, 65. (Counts fingers at 2 feet before operation); after operation reads 0.5 at 8 inches with + 18 D.s.

Case II.—Male, 63. (Before operation counts fingers at 1 foot, pupil undilated); reads 0.8 at 8 inches with + 18 D.s. after operation.

Case III.—Female, 70. (Before operation counts fingers at 15 feet); after operation reads 0.5 at 7 inches with + 18 D.s.

Case IV.—Male, 61. Opacities in lens ill-defined, slight central haze of cornea; sees No. 3 Sn. at 4 inches; can see disc; extensive posterior staphyloma. After operation reads 2.25 Sn. at 4 inches with + 16 D.s.

Case V.—Male, 57. Before operation counts fingers at 3 feet; after operation reads 1.75 with + 18 D.s.

Case VI.—Male, 51. Able to go about. After operation, iritis. Syphilitic and rheumatic subject. After operation counts fingers at 4 feet; iridectomy indicated; other eye perfectly successful.

Case VII.—Male, 63. Before operation counts fingers at 2 feet, can see large part of fundus; after operation sees 0.5 at 5 inches with + 18 D.s.

Case VIII.—Male, 55. Sees 1.75 at 3 inches, very myopic always, vision same for years, can see fundus; after operation sees 0.6 at 4 inches with + 18 D.s.; will probably be further improved by tearing capsule. After tearing capsule he came to see 0.5 at about 10 inches with very weak convex glass.

Case IX.—Male, 61. Iridectomy performed by another surgeon four years ago, probably for simple glaucoma; always very myopic; small radiate opacities only; can see fundus. After operation reads 1.75 at 4 inches with + 16 D.s. The vision was only slightly improved by operation; slight irritation and fluctuation of tension for a long time after operation; slight haziness of cornea.

Case X.—Male, 55. Obliged to give up work a year ago; left eye simply a central cloudiness and some peripheral streaks of opacity; can see fundus. After operation sees 0.5 at 8 inches with + 18 D.s.

Case XI.—Same patient. Right eye same condition; find he can read with great effort smallest type, but could not see far off, which he required to do for his work, and he desired operation. After operation and subsequent needling of wrinkled capsule sees 0.5 at 8 inches with + 18 D.s.

Case XII.—Male, 50. Not able to work for four years, and vision stationary; can see fundus; superficial radiate opacities. On injection some vitreous came with transparent cortex. After operation could read small type, but I have not note of exact particulars.

Case XIII.—Female, 64. Other eye operated on previously successfully; can see fundus, but in a haze. On sixth day after operation severe pain, which I found owing to impaction of iris in one angle of wound; removed incarcerated iris; eye became quiet, but requires iridectomy. Counts fingers at six inches.

Several of these thirteen cases represent the ultimate point to which ophthalmic surgery in the matter of cataract operations can be expected to reach.

As to the other nine cases of immature cataract, with striated cortex and transparent segments, the results were all excellent.

I have nothing to remark about the five complicated with serious affections of the eye and its appendages, save that in one complicated with a chronic dacryocystitis, which latter affection was treated in the usual way for a week before operation, the eye was lost from suppuration of the cornea, notwithstanding thorough antiseptic treatment before, during, and after operation, including injection of M. Panas's solution into the interior of the eye, and application of Galezowski's gelatine antiseptic disc over the wound.

Of the fourteen cases of traumatic cataract, a considerable number were immature, but I have only to note one mishap—namely, a panophthalmitis starting from the wound, notwithstanding thorough antisepticism, so far as it could be carried out. The patient was beyond control. He would not allow bandage to remain for ten minutes at a time after the operation.

I have entered into these particulars because without them bare statistics would be very misleading. Of the three cases of panophthalmitis in the whole hundred, not one can be attributed to the injection, and not one could have been avoided except by not operating, or by putting the patients under a sort of prison discipline. Of the three cases of iritis in the 81 vision may be improved, and of the three cases of iridocyclitis I can only speak definitely of one ; but assuming that the other two, which I have not seen for some time, have taken the worst form, I should only have a total of 3 complete losses in 81 operations on idiopathic uncomplicated cataract, including the 22 unripe.

I shall now touch very briefly on some general questions.

1. Is injection of distilled water previously boiled and reduced to the temperature of the body attended with any appreciable danger as regards the introduction of germs within the eye? In all cases except thirty (in which I injected M. Panas's solution), I have used distilled water, and in not one case have I seen any evidence of intra-ocular inoculation.

2. Is injection dangerous because of the force employed to remove cortex? As may be observed from the notes of un-

ripe cataracts operated on, the water must have exercised considerable force to clear out transparent and sticky cortex, yet the results are quite as good as in the ordinary operations for mature cataract.

3. Is the injection of M. Panas's solution desirable? I have injected it only 30 times in 100, and therefore cannot speak very decidedly about it. I would remark, however, that in two cases it did not prevent suppuration of the cornea and panophthalmitis; true, in one case there was an affection of the tear passage, and in the other the patient was unmanageable. I fear it has an influence, though it may be a small one, in causing iritis. I have seen extensive posterior synechiæ and muddiness of posterior surface of the cornea arise from its injection into the anterior chamber after removal of a cyst of the iris. At any rate, I have found no advantage from it, and have abandoned it.

4. Is the injection of M. de Wecker's solution of eserine desirable? I have injected it nine times, and I have used the solution a considerable number of times by simply pouring it into the conjunctival sac, and easing the pressure of the eyelids on the ball, so as to facilitate the entrance of the solution into the anterior chamber, and I have found that the latter mode is quite as effectual in contracting the pupil as the former, indeed, perhaps more so. I do not apply the bandage till the pupil is well contracted. I have noticed in some instances some adhesions, and have been obliged, because of pain, occasionally to apply atropine; but I have so far found no positive disadvantage from the eserine. I wish to do strict justice to M. de Wecker's eserine treatment, and therefore add that in one respect I have not followed his advice, namely, in removing a piece of the anterior capsule. I have simply torn it freely.

5. Should force be used in the injection? I consider it impossible to remove the cortex in the majority of cases of immature cataract on which I operate without force. The more cortex left behind, the less likely is force to do harm, and the more it is required. I am never troubled because of the

quantity remaining after the nucleus is expelled. It is a mistake to suppose that one injection—at least by the old syringe, whose piston was too easy—is always enough. Sometimes two or three are required; but it is probable, with the improved piston of the new syringe, the clearing out of the cortex may be more easily accomplished. Experience teaches the surgeon what he can safely do. He should use injection at first in cases in which he is not likely to experience any difficulty; then take up cases of striated cortex not far from being ripe; and, finally, cases of very slowly progressing cataract, such as those of which I have given particulars. In this way he will acquire confidence and the dexterity born of experience.

6. Allied to the question of force is that of the instrument to be used. One of the most striking things about this question of intra-ocular injection is the number of instruments devised since 1884. I at first used the force of gravitation, and changed to injection. M. Wicherkiewics uses the force of gravitation from his "undine," and the force may be considerable. M. Panas describes his instrument as follows: "L'instrument laveur du globe est analogue à un comptegoutte muni d' un tube en caoutchouc durci." M. de Wecker's consists of a body like a small-sized ear speculum, the wide extremity being covered by india-rubber, and the small end having a silver terminal to introduce into the eye. He says: "C'est évidemment le meilleur instrument de contrôle car la pulpe si sensible du doigt indicateur appliquée sur le tambour permet de régler avec la plus grande précision le degré de pression qu'on veut exercer pour introduire le liquide à injecter dans la chambre antérieure.

M. de Wecker also points out as an advantage of his instrument and method, that the danger of suction is avoided, and the tension of the eye estimated and regarded. If the tension is high, the small aperture in the nozzle of his instrument may be obstructed. I hold that the instrument should be so constructed and capable of exercising such force as to clear out the remains of the lens, without regard to tension. The very

small instruments, with small capacity, with tiny nozzles and small slits and holes in the sides and in front are insufficient to cope with ease with unripe cataract, but are doubtless useful in washing out the anterior chamber and interior of the capsule in ordinary operations. My instrument is so constructed as to yield a free and broad flow regulated in its force by the finger on the piston, just as the force in M. de Wecker's instrument is regulated by the finger on the india-rubber covering of his compte-goutte. The finger is just as delicate a regulator of force in one case as in the other.

In the new instrument I present to you you will find many changes. There are two bodies of syringe of different lengths, and various nozzles of different lengths, widths and forms to suit different hands and sections of different position and size. I have found that the syringe and nozzle hitherto in use are unsuitable for the upper section in very prominent eyes, particularly if the hand of the operator is short, and likewise for lower and for lateral sections. I have, therefore, provided short nozzles of various widths and lengths. The chief idea to be borne in mind is: that the various nozzles are only the channel for conveyance of the water power, and are not to be regarded as ordinary scoops or levers, and are therefore not to be considered as agents for exercising the ordinary mechanical force of scoops. The terminals with a little edge at the end, like that of Critchett's scoop, may be used as scoops, but they are only meant by a little to and fro movement, and not by a leverage action, to aid the removal of masses of adherent cataract set in motion by the water. A new form, with a scooped out part at each side, is meant to break the force of the water in cases requiring little force.

7. Should iridectomy be performed? In one of my papers I stated that I considered iridectomy should be performed in all cases of intra-ocular injection. M. de Wecker points out, however, that intra-ocular injection has a marked influence in causing contraction of the iris, and therefore ensuring a greater immunity from the old blot in the old flap operation—prolapsus of the iris. He adds to the beneficial effect by using a

solution of eserine instead of plain water. He, however, considers iridectomy necessary in immature cataract. I entirely agree with his view as to the restriction of iridectomy, and now I always operate on cataracts, mature or nearly mature, in patients on whose obedience to instructions reliance may be placed, without iridectomy; but in very immature cataracts with iridectomy. I do not now, as a rule, inject eserine into the eye, but instil it freely, as I have already stated.

8. General applicability of intra-ocular injection. A point which cannot be too much impressed is the wide sphere of usefulness of intra-ocular injection. It may be used in every sort of extraction except the extraction of the lens in its capsule: for example, in the flap operation, old or new, with or without iridectomy; in Graefe's operation, in simple linear extraction, as a substitute for the old spoon extraction and the suction operation. It may be applied in unripe idiopathic cataract and unripe traumatic cataract. Its universal applicability is one great feature. The gentle, moderate, and diffused power of a fluid is substituted for leverage instruments and pressure outside the eye. It rejuvenates old methods discarded, unsettles old notions about ripeness of cataracts, and brings us nearer the goal of the surgeon—to give speedy and effectual relief to sufferers hitherto doomed by imperfect methods to long years of delay and misfortune.

I do not wish to say that anyone of all the instruments devised for intra-ocular injection is perfect. I wish to emphasize the method as that of the removal of cortex by the force of a fluid. The operation for cataract is a purely mechanical procedure, and I hope that year by year we shall more and more perfect our appliances, and that all the instruments we have hitherto devised may be replaced by others more effectual, and that by our labors we shall increase the sum of human happiness.

David Little On the Operative Treatment of Zonular Cataract.

In bringing the subject of zonular cataract before you, it is

my intention to make a few remarks on the operative treatment, and I shall confine my observations chiefly to those cases of ordinary uncomplicated zonular cataract in which there is no arrest in the development of the eye, no shrinking of the lens, and no vitreous opacity or deeper seated disease.

I may say at the outset that I have nothing new to offer in the way of operation, beyond advocating a method which I have found from experience to be the best for gaining good vision. It is this, that when destruction of the lens is decided upon, I recommend a free crucial rupture of the capsule with a needle, so as to make the whole lens opaque and more soft, and two or three days afterwards to perform extraction by means of a Teale's suction instrument.

The disturbance of vision caused by zonular cataract depends altogether upon the extent and density of the opaque layer. If, on dilating the pupil, the zone is broad and perfectly transparent, vision may be fairly good; on the other hand, if the central opacity is great, considerable reduction of sight must exist.

My experience in the examination of the refraction in these cases is that some are emmetropic, a few only are hypermetropic, but the great majority are myopic. I never fail to test the vision before and after atropine, at the same using lenses to correct any defect in the refraction.

In the case of very young subjects whose vision cannot be accurately ascertained I postpone all interference for a time, unless it is quite manifest from the extent of the opacity that sight is bad. It is upon such an examination as this that I base my opinion for operative interference or otherwise.

I recommend destruction of the lens in all cases that are found to be of a progressive character, also in non-progressive cases where vision equal to at least twenty-fiftieths is not obtainable, after dilating the pupil with atropine. I would go further than this in exceptional cases, and say, if I found that twenty-fiftieths was not sufficient sight for the requirements of the patient, and if he or she were between the ages of 10 and 25 (which I consider the most favorable age for operation), with

perhaps some myopia, and all other conditions favorable, I would not hesitate to recommend extraction. When the lens, then, has to be dealt with, there is the operation by solution. This is a tedious process, and I hardly ever adopt it in zonular cataract.

I have been most satisfied with the suction operation. Having dilated the pupil, I make a free rupture of the capsule across the pupil extending from margin to margin; a similar rent is made from above downwards, keeping the needle well in the anterior part of the lens. The capsule is extensively ruptured in this way to cause its retraction well behind the iris, and so avoid secondary operations; the needle should not penetrate too deeply for fear of rupturing the hyaloid or dislocating the lens. A light bandage is placed over the eye, the patient is kept quiet, and atropine freely used to dilate the pupil. After two or three days, or more, according to the condition of the eye, extraction is performed by a Teale's suction curette. This is accomplished by making an incision in the outer part of the cornea, halfway between the limbus and centre, with a double cutting edged needle from 3 to 4 millimètres broad. Through this wound the curette is introduced into the area of the pupil, taking care not to push the open end behind the iris or too deeply into the pupil. Suction is then applied by the mouth, and by this means the whole of the pupil can be easily and rapidly cleared. The patient is then placed in bed, with a light bandage over both eyes; atropine is again used to keep the pupil dilated, and in the course of a week or ten days recovery may fairly be expected.

I have tried a Bowman's suction syringe, but I much prefer Teale's. The advantages of the latter are that suction can be better regulated by the mouth, and the hand is left free to guide the curette, while in the case of Bowman's there is a difficulty in applying suction by the hand, and directing the curette with it at the same time. The advantages of suction over ordinary linear extraction are that the pupil can be cleared with greater certainty, and there is little or no disturbance to the eye by pressure, two conditions, I think, of the greatest importance.

It is said by some there is a danger of suppurative iritis or iridochoroiditis in this suction operation. Speaking from my own experience, I have never met with symptoms so serious as to cause anxiety; and I consider the operation a safe one, if performed with care and judgment. I am careful that the curette is absolutely clean before use, and of late years I have used antiseptics at the time of extraction. On looking over my hospital and private notes during the last eight years, I find that I have performed this operation in forty-two cases, and in the great majority of them I have secured brilliant results as regards sight. The records of some of them are somewhat imperfect, particularly as regards the resulting vision, partly from the youth of the patients, and partly, also, from the difficulty of following up hospital cases. The condition of the eye, however, has been noted in all. In no instance has there been a failure. In three cases there was synechia anterior; in five cases secondary operations had to be performed on account of capsule. In all the others there was a perfectly clear and round pupil, and I attribute this freedom of the pupil from capsule to its extensive rupture in the preliminary operation. The ages of the patients ranged from 5 to 27 years, and I have followed the usual practice of operating upon one eye only at a time.

Regarding iridectomy, I would say that if dilatation of the pupil improves vision to twenty-fiftieths with or without glasses, this operation, generally speaking, should be adopted, with a few exceptions to which I have already referred.

I should prefer iridectomy also, even when only a moderate improvement of sight can be obtained, in all cases accompanied by some mental defect in the patient, arrest in the development of the eye, shrinking of the lens, or when there is evidence or suspicion of posterior disease. When a small iridectomy is desirable, the best method is that recommended by Mr. Anderson Critchett, in a paper he read before this Association, at Worcester, in 1882, to which I would refer you; he uses a broad needle, and a Tyrrell's hook, both instruments bent almost at a right angle, and excises a small portion of the

pupillary margin of the iris downwards and inwards, leaving the periphery untouched.

Referring to the current belief that zonular cataract remains stationary throughout life, I have no conclusive evidence to show that opacity has ever become developed in a zone once absolutely transparent; but I believe that later in life, when the lens becomes harder, the opacity extends to the deeper nuclear layers, and so causes serious deterioration of sight. I have seen at least four cases about 50 years of age, in whom sight had become slowly reduced to 20 Jäger, apparently from no other cause than an increased density of the central opacity, involving the whole nucleus.

In operating upon such cases by the ordinary method for hard cataract, I have always found the eye most intolerant of operation. In every case more or less iritis followed, and many weeks elapsed before recovery took place.

The main purpose of this paper is a recommendation to perform extraction by suction oftener than is generally done, because I think that cases are frequently treated by the easier method of iridectomy, in which the resulting vision is disappointing to both patient and surgeon. Another object is to elicit information regarding the progression or otherwise of this form of cataract.

Discussion.

Dr. Emrys Jones said that his experience led him altogether to question the desirability of injecting any fluid whatever into the anterior chamber after cataract operations; he thought that there was considerable danger of introducing germs in this way, and that there must be greater liability to set up iritis and other complications. He had for the last two years used Mayo Robson's dry eucalyptus spray apparatus in cataract extractions, and he had about 130 consecutive cases without a single case of suppuration of the the cornea and with very few cases of iritis. The resulting vision had been in the majority of cases very good.—Mr. Berry had seen three cases

performed by Dr. McKeown, and must admit that his method was fairly efficient as far as the removal of cortex, which might otherwise give rise to difficulty, was concerned; but as it produced not a little irritation he (the speaker) had not adopted it until more experience had been accumulated. With regard to Dr. Little's excellent paper it was interesting to find that Dr. Little used suction. He (the speaker) had always found linear extraction, which must, however, be done by means of a sufficiently large incision, 4 to 5 millimétres, practically in every way efficient.—Mr. McHardy considered that, having regard to the published analyses of the water supplied by the various London companies, Dr. McKeown's "pumping proceeding" must be fraught with great danger from the introduction of germs. He had been accustomed to utilize the aqueous humor as a solvent for any remaining cortex; this was rapidly resecreted after its escape, and if the eye be closed for a few minutes after the escape of the nucleus, the admixture of aqueous with the cortex materially facilitates its removal by friction. In the cases of immature cataract in which operation was indicated he adopted Foerster's plan of artificial maturation.—Mr. Priestley Smith thought that Dr. Chisolm's claim that he had introduced a novel method, which would revolutionize practice, went beyond the merits of the case. His friend Mr. Hodges would bear him out in saying that at the Birmingham Eye Hospital, fifteen years ago, closing the lids with strips of black court plaster, without pad or bandage, was a favorite method of dressing cataract operations. The speaker had employed it largely, and decidedly preferred it in glaucoma iridectomies. It was, he believed, a very old line of practice. In using adhesive plaster, it was important to leave an exit for tears, and he thought itching was rather more apt to occur than under the pad and bandage. As to confinement in bed, it was not of great moment whether we kept our patients in an upright or in a horizontal position, but it was very important to avoid frequent or sudden changes in the position. Sudden changes in the pressure of the blood column easily led to reopening of the wound and to hæmorrhage into the

chambers. Such slight transgressions as stooping to reach a shoe or to move a footstool, or, as in one case of his own, carrying a coal-box, were dangerous shortly after cataract extraction. If operating surgeons were to disregard common sense and time-honored principles, we should soon hear of disasters. With regard to dark rooms, the speaker's own hospital patients lay in large wards, occupied also by medical cases. He gave more or less protection by a bed-curtain, but had never employed dark rooms.—Mr. Adams Frost had used Dr. McKeown's method on several occasions, and as far as its mere mechanical effect was concerned, had found it as efficient as friction; the risk of infection, however, rendered it imperative to take elaborate precautions, and as there was always the uncertainty beforehand whether injection would be required, this had led to his abandoning the proceeding.—The president said that Dr. McKeown's method was not one that recommended itself to his surgical instinct, and the results that Dr. McKeown had himself adduced would not encourage him to attempt it in the future.—Dr. McKeown, in reply, said with respect to the surgical instinct of the president being against intra-ocular injection, the surgical instinct of the profession, as a whole, in relation to new operations, was invariably wrong for a variable period of time, when the new operations were much at variance with old practice and preconceived notions. The surgical instinct of the profession generally was long against ovariotomy, but the surgical instinct of the ovariotomists had proved to be a safe guide. The same held about more recent questions. The president had taken an entirely wrong view about the bearing of the statistics. A little escape of vitreous was not a serious matter, and, in the eight cases referred to, only two had any relation to the question under discussion, namely, intra-ocular injection. His paper, when carefully read, would show that, taking the whole cases, complicated and uncomplicated, ripe and unripe, idiopathic and traumatic, the statistics were most assuring, and quite equal to the statistics of selected cases of mature cataract. In the whole 81 cases of idiopathic cataract (including 22 cases of most unripe

cataract, on the majority of which no surgeon with the ordinary methods would operate), there were only three total losses at the utmost. As to the case of the president, in which injection did not remove any unripe cortex, the probability was that the terminal had not been introduced inside the capsule. The president thought that some of the cases described were not simply immature cataract, but incipient cataract; but, if incipient cataract of one to three or four years, or more, standing could be operated on by injection, nothing further was required to put it on a level above any other operation ever practiced. Dr. Emrys Jones and Mr. Mc Hardy; without having had any experience of the method, or even having seen anybody use intra-ocular injection, had condemned it. No doubt the most competent critics were those who knew nothing practically about it—of course, they were far better able to jndge of it than one who had been using it for three years in a public institution, open to the profession, and who had, on every occasion possible, demonstrated its utility to students and medical men. As to the cases mentioned by other speakers, they only amounted to six or seven, and they were not to be taken into serious consideration in face of the details Dr. McKeown gave in his paper, and of the experience of the most distinguished Continental ophthalmic surgeons. Mr. Priestly Smith inquired respecting the size of the nozzles. It was well known that, if water be driven with force through a very small opening, the force exerted on a limit area was very much greater than if the same force were exercised through a wide opening. The object was to direct a pretty uniform force on the whole of the internal surface of the capsule, and not a strong force on any one point. The nozzle being broad and the slit long, this was accomplished. Besides, the broad nozzle gave support to the vitreous humor. The capacity of the body of the syriuge was considerable, as it was a mistake to have only a few drops when force had to be used. When the operator had more than he required, he need not use it; when he had too little, he had to remove the instrument, and replenish it.—Mr. Snell, replying to the remarks made on the treatment advocated in his

brief communication, pointed out that many of the subjects raised had been dealt with in his former article. His mode of cutting the plaster allowed for the escape of tears, and patients did not complain of any discomfort; but those who had been treated otherwise on previous occasions acknowledged the greater comfort of the plaster treatment. He was not aware that Mr. Priestley Smith had used plaster so much in his practice. The method he had advocated, however, appeared more complete than had previously been adopted. Referring to Dr. Little's paper, he remarked that he had not seen the danger from using the suction curette which in some hands had been experienced. For some time he had used suction very little because it appeared unnecessary, for if the lens were well hooked up, the softened matter readily escaped through a small corneal wound. His rule was to introduce as few instruments as possible into the eye.

CORRESPONDENCE.

"VISUAL RECORDS."

EDITOR.—Since the appearance of my article on "Visual Records" in your December number, I have run across Landolt's description of Monoyer's test-type, between which and those I suggested, there seems to be a strong similarity.

I have access, at the present moment, neither to Monoyer's original description nor to a copy of his test-type, and therefore cannot say how close this similarity may be. If my proposition is already old, it has certainly suffered an unmerited neglect, but whether old or new it is of such manifest practical usefulness, as to deserve the careful consideration of those members of the profession who are desirous of simplifying and unifying our case-records. Yours very truly,

HAROLD B. WILSON, M. D.

ANN ARBOR, MICH.

EDITOR AMERICAN JOURNAL OF OPHTHALMOLOGY:—There is one point in regard to granulated lids which I have very frequently noticed in practice, but cannot recall any mention of by writers, and that is the offensive odor so distinct and frequent about the eyes of these patients. I would be glad to have your opinion in regard to it. Also allow me to correct the error made by Dr. S. M. Burnett, of Washington, D. C., who, I believe, made the statement some months ago that granular lids was a disease almost unknown in the negro race. As I live in a section where nearly one-half the population are negroes, and know whereof I speak, I know that I encounter the disease among negroes *very* frequently, and if I desired this class of practice, I could treat very many more cases among negroes than I do. Very truly,

R. O. COTTER.

MACON, GA.

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THE NEW LOCAL ANÆSTHETIC—HYDROCHLORATE OF ERYTHROPHLEINE.

BY ADOLF ALT, M. D.

The disagreeable experience but recently made with the alleged local anæsthetic, gleditschine, cannot but caution us with regard to new drugs which are offered to the profession without having first undergone a careful chemical investigation. When, however,a few weeks ago it became known this side of the Atlantic, that Dr. L. Lewin, had announced to the Berlin medical Society, that he had found a new local anæsthetic in Erythrophleine, the alkaloid extracted from the bark of an African tree, Erythrophlaeum judiciale, I had no doubt that here we had to deal with a real new remedy and not with a fraud. I, therefore, tried to procure it, but in vain, when I received the following circular, which is here reproduced in full.

ERYTHROPHLEINE.

The Active Principle of Erythrophlæum Guineense.

From a most interesting paper, read a month ago (January 11th, 1888,) before the Medical Society of Berlin, by Dr. L.

Lewin, I extract the following concerning a drug that promises much. If it possess the properties and power that Dr. Lewin positively states it does, it will probably supersede Cocaine, because of the advantages it presents over even that most valuable alkaloid.

The Hydrochloride of Erythropleine (made by E. Merck, of Darmstadt,) is readily soluble in water. *A two per cent.* solution in a dog's eye renders it insensible for from *10 to 24 hours.* This solution is *much stronger than need be* for anæsthetic uses, as will be seen as we proceed; for Dr. Lewin states that "solutions of the strength of one-fourth or one-tenth or one-twentieth of one per cent. produce anæsthesia of the cornea and conjunctiva, continuing for from several hours up to two days, and gradually decreasing in intensity during that time. The action is altogether local, and if a solution of it be injected into the *eyelid* of an animal, this becomes so insensible that touch does not induce motion, while the eye itself retains perfectly its sensibility."

"To give an idea of the powerful action of this substance, I mention the following: If we make a solution of the proportion of $^1/_{10}$ gramme to 100 grammes of water, *e. i.*, $^1/_{10}$ gramme to 2000 drops of water, (approximately $^3/_4$ of a grain to one fluid ounce or a solution of about $^5/_{100}$ of one per cent.—McK.) and of this inject three full drops into the eye, full anæsthesia is produced, (by 0.00015 grammes Erythrophleine hydrochloride) (or twenty-three ten-thousandths of a grain—McK.) If from 0.0005 grammes to 0.0015 grammes of this solution be injected into a guinea-pig, such an insensibility is produced in the injected part that one can cut these otherwise so sensitive animals deeply, down to the muscles without observing any symptom of pain."

"In frogs which have been tetanized, no further tetanus can be produced upon the injected point. After an injection of Erythrophleine in a limb, it can be pierced without any reaction. After a subcutaneous injection of an amount equal to one-fourth of a hypodermic syringe of a two per cent. solution, such an insensibility is produced in these animals in about fif-

teen minutes at the point of injection, that touching them with concentrated sulphuric acid, or with a red-hot needle, is not felt."

"I, myself, dropped into a wound in my finger, which had been caused by glass and was very painful, a few drops of a two per cent. solution, and the pain which had before that been persistent and had increased with pressure, ceased after about ten minutes, and could not be re-established by the firmest pressure. This analgesy persisted for about an hour and could be continued by entire days."

As to the general constitutional effect of this drug, Dr. Lewin says but little, except that in therapeutic doses it has a "digitalinic effect upon the heart."

His investigations began in an attempt to determine the source of the "Haya poison," used by the natives of Western Africa as an arrow poison, and, little by little, his experiments led to the assurance that it was prepared from the Erythrophlæum.

I have to-day about all of this alkaloid there is in the United States, and that is comparatively little. I expect a larger quantity of it very soon, and as I understand that Mr. Merck believes it has a great future and is preparing it on a large scale, and as the bark from which it is extracted is plentiful and cheap, we are likely to have plenty at reasonable rates. It is worth to-day about $1.00 per grain. Solutions of say one-half grain to the fluid ounce would seem to be about the proper strength for use in the eye. Before much of it is injected into the circulation more should be known of its constitutional effect, especially with reference to the heart. See article on "Erythrophlæum" in both *Wood, Remington & Sadtler's Dispensatory* and in *Stille & Maisch's Dispensatory*.

George I. McKelway,
1014 Chestnut Street, Philadelphia, Pa. Apothecary.

I have since received the *Centralblatt f. Augenheilkunde*, for January 1888, in which Lewin's reports are given, which he made at the meetings of January 11th and 25th. From these I

extract the following passages for the benefit of our readers:

"* * * The anæsthesia produced by a solution of hydrochlorate of Erythrophleine is as intense as can be imagined. When a solution of $^1/_5\%$ is instilled into the eyes of cats, rabbits, etc., an anæsthesia is produced in from 15 to 20 minutes which *lasts from* 1 *to* $2^1/_2$ *days.* Even solutions of $^1/_{10}\%$ and $^1/_{20}\%$ have this effect. More concentrated solutions, as for instance, a 2% solution, cause a typical and very intense irritation, followed by dense opacities of the cornea. * * *

* * * Further experiments were made on large dogs. In these the instillation of a $^1/_{20}\%$ solution into the eyes, produced a profound anæsthesia of the conjunctiva and cornea. * * *"

In a foot note Hirschberg adds: "I have removed a foreign body from the cornea in seven cases after having instilled a solution of 0,01 Erythrophleine muriat., in Aq. sublimat. (1:5000) 5,0 (a $^1/_5\%$ solution). The anæsthesia came on later than after the instillation of cocaine; the patients complained of a burning sensation. Rainbow-colors were seen subsequently."

The substance which I obtained a few days ago from the sender of the circular, Mr. McKelway, was a very fine straw-colored powder, which readily dissolved in water, giving a perfectly clear odorless solution. Some of a $^1/_{10}\%$ solution when heated with sulphuric acid took on a slightly yellowish-red tint, (like that of pale tea-roses), but not the rose color, which Lewin describes as being characteristic of the alkaloid itself. I have so far experimented with a $^1/_{20}\%$ solution only with the following results.

One drop of this solution instilled into the lower cul-de-sac of the normal human eye produces a *noticable* anæsthesia of the conjunctiva to the touch in two minutes, which becomes *profound* in from seven to nine minutes. The cornea becomes anæsthetic much later and not as profoundly so as the conjunctiva. Even after twenty minutes, although the touch to the cornea can be born, it is still felt. The blood-vessels of the conjunctiva do not seem to be influenced by this drug, certainly there is nothing like the anæmia following the instilla-

tion of cocaine. The pupil and accommodation are not influenced by this drug. There is, however, a disagreeable burning sensation complained of which lasts for some time. Rainbow-colors, like Hirschberg, I have not seen, probably, because the solution I applied is so much weaker. The anæsthesia produced by one such drop lasts for the cornea about four hours and is at that time already considerably diminished in the conjunctiva.

If one drop of a $^1/_{20}\%$ solution is applied directly to the cornea, this membrane becomes anæsthetic to the touch in about ten minutes, but not as quickly nor as profoundly so, as does the conjunctiva.

In a case of trachoma with ulcus corneæ and intense photophobia, two drops of the solution allowed the patient to open her eye easily after ten minutes and the pain, complained of previously, disappeared. The patient felt considerably easier, but when seen twenty hours after this instillation, the conjunctiva was but very slightly anæsthetic, the cornea not at all. However, one drop of the solution now sufficed to produce a deep anæsthesia in four minutes, so that the touching with copper was barely felt. This is more than in my experience can be obtained with cocaine.

In a case of traumatic iritis the instillation of two drops of the $^1/_{20}\%$ solution caused evidently a considerable increase in the pain, which lasted six hours, perhaps due to an increase of the intra-ocular tension.

From these few experiments it is plain, that we have in the new remedy one that may, when its proper realm of action has been established, be a very valuable addition to our therapeutical agents. To find just where and when its application is most useful and indicated, must be the aim of all who have a chance to experiment with it. The marked difference in its action upon the conjunctiva on the one, and upon the cornea on the other hand is a strange phenomenon. The seeing of rainbow-colors of which Hirschberg speaks would, it seems, indicate a positive influence of the drug on the intra-ocular pressure, which should guard us from using it in eyes with a glaucomatous tendency.

Further experiences with this drug we shall report in our next issue.

THE ADVANTAGE OF OPERATING EARLY FOR STRABISMUS.[1]

BY J. F. FULTON, M. D., PH. D.

Professor of Ophthalmology and Otology, St. Paul Medical School.

There is no operation that the ophthalmic surgeon feels more certain of accomplishing or that which his patient usually desires more than the operation for strabismus. We, as a rule, are safe in promising to straighten the eyes of all who come to us for that purpose, provided they permit us to operate as often as necessary. But there are some other troubles connected with this deformity which are not so easily overcome, namely, diplopia and the amblyopia so frequently met with in these cases, and it is to these two symptoms that the ophthalmic surgeon should direct his attention chiefly, in the treatment of this class of cases.

I agree with Soelberg Wells that the active suppression of the pseudo-image results frequently in amblyopia, and this amblyopia increases rapidly in children or shortly after the strabismus first shows itself. In this connection he says: "The operation should never be unnecessarily deferred. The question is often debated as to whether a child of two or three years of age should be operated upon for squint or whether it is not better to postpone an operation until it is much older My opinion is very strongly opposed to the latter practice, and is urgently in favor of the operation being performed as soon as possible whilst binocular vision still exists and the sight of the squinting eye is good. When it is, however, absolutely

[1]Read before the Section of Ophthalmology of the Ninth International Medical Congress.

necessary to postpone the operation, the vision of the squinting eye should be frequently practiced, and each eye separately used for reading, etc.

Stellwag, although strongly opposed to that of operating before puberty, urges the necessity or importance of separate exercise for the squinting eye, in order, he says, to avoid the development of a central anæsthesia. For this purpose, he says, it is necessary to exclude from the visual act the eye usually employed for fixation, and to exercise the defective eye several times daily. I think this whole subject can be made clear by recognizing the fact which clinical and careful investigation seem to distinctly prove, that amblyopia met with in cases of squinting is either primary or secondary. What I mean by primary amblyopia is that which is due to some defect either in the structure of the eye or in its perceptive powers, and is always congenital. For this there can be nothing done in the way of operating or treating the strabismus, but I am very positive in my opinion that a large proportion at least, of the cases of amblyopia thus met with is secondary to, and the result of the strabismus. It is one of the laws of nature, to which there are certainly but few exceptions, that suppression of activity will result in deterioration of the function of the part. It is so here. The objects not being focused on the same place on either retina results in a double image, and finally in a suppression of the image in one eye and the disuse of that organ, which gradually, in some cases very rapidly, loses its functional activity. As proof of this, how rare it is to meet with amblyopia in alternating squint, or in those cases in which the refraction and acuteness of vision are alike in the two eyes. In each it is a mere matter of accident which eye will be directed toward the object, and which toward the nose, the reason of this being that both eyes are exercised alike. But in the other class of cases in which the refraction of the eyes is different, the vision of the best eye is used by instinct, and the squinting is always done by the defective eye. The squint is then said to be fixed, and under such circumstances the vision of the squinting eye will usually undergo a steady, progressive deterioration." (Carter.)

And I maintain that this progressive deterioration of vision can be prevented in a great many cases by curing the squint, either by the use of glasses, or if necessary, by an early operation. In this connection, and in proof of what I have just affirmed, permit me to refer to the history of a few cases:

A young man, 18 years of age, came under my treatment some years ago, with the following history: He had been examined eight years previous to this by an oculist. His books showed the condition of his vision to be as follows: Acuteness of vision in right eye $^{20}/_{xx}$; the vision in the left eye $^{20}/_{xxx}$. This eye was hypermetropic to about one diopter. Vision could be raised to normal by +0.75 glass. Convergent strabismus had already commenced. He was advised to use atropine and glasses, but for some reason this had been neglected, and the strabismus developed, and also, as the future history proved, deterioration of vision in the left eye developed also. Just before coming to me he met with an unfortunate accident. A little boy shot a horse-shoe nail into the right eye which entirely destroyed the sight. It was necessary to enucleate it. The vision of the left eye was $^{20}/_{lxxx}$; even this vision was uncertain, as he had the so-called "come-and-go" acuteness of vision. This could be improved but very slightly by the correcting glass, but by constant and presevering exercise the acuteness of vision was gradually improved, and continues to improve up to the present time. He now reads $^{20}/_{xxx}$. This case certainly proves beyond the possibility of doubt that amblyopia does develop as strabismus develops, and that it can be relieved by proper treatment and systematic exercise. Is it not possible and reasonable to suppose that had the operation for strabismus been performed when this first developed that deterioration of vision in this eye would have been prevented?

I wish here to relate briefly the history of another case which has strongly impressed me as to the importance of in some way relieving strabismus as soon after it shows itself as possible. Two members of the same family, a little boy and little girl, each had convergent strabismus, apparently the result of a low degree of hypermetropia. Strabismus began to develop

in each about the sixth year. The boy was eight years of age and the girl nearly seven when they came under my observation. The left eye of both children was slightly amblyopic, each reading in the defective eye $^{20}/_{xl}$, as near as could be made out in children so young. The strabismus was well marked reaching a little over three lines in both. An operation was advised for both, but the parents consented only to have the operation performed on the elder child at that time. Both, however, had the refraction carefully corrected with glasses. The child upon whom the operation was performed had binocular vision perfectly restored, and his acuteness of vision remained at $^{20}/_{xxx}$ with the correcting glass which he always used. The strabismus remained stationary in the younger child, but the amblyopia increased, as an examination several years afterward, showed distinctly. I think it is but fair to conclude that had this child been properly treated she would not have suffered deterioration of vision in her defective eye.

Anyone who has had much experience in the treatment of squint recognize hosw difficult it is to restore binocular vision after it has once been lost, yet this is an object of paramount importance, and I maintain that it is much easier to do this by operating early, soon after strabismus shows itself, than it is to operate later in life. I have from time to time carefully examined young people who had their strabismus cured by a timely and proper operation early in life, and in but few such cases have been able to demonstrate the absence of binocular vision. All the defects of the operation, the deformities resulting from it, such as sinking of the caruncle, are less likely to take place after an operation on children, in my experience, than after operating on adults. The loss of relationship between the "accommodation" and the internal recti muscle, together with asthenopia, so frequently met with after this operation has been performed upon adults, is much more easily overcome, or I should say much more easily overcome by nature herself, when the operation is done on children, than at other periods of life. And it so frequently happens that the treatment of asthenopia after the operation has been success-

fully performed, is much more tedious and much more annoying to both patient and surgeon than any other part of the treatment. After strabismus has lasted for a number of years it frequently results in most serious loss of proportionate strength between the internal and the external recti muscles. There is very great thickening and contraction of the internal and corresponding elongation and atrophy of the external, rendering the trouble all the more difficult to remove. Such a course is prevented by operating early in life.

These conclusions are arrived at by actual experience and clinical observation. I am well aware that they are contrary to our usually accepted theories on the subject. But theories are far-fetched attempts at explanation, and should not be permitted to weigh in the balance with experience. There are many obscure points in ophthalmology which cannot be explained by any theory. We must learn to look such calmly in the face, in order to undertake with courage the task of elucidating them. General medicine, which has for ages been the object of investigation, together with all branches of science, affords many more unfilled gaps than does ophthalmology which was, so to speak, born but yesterday. Hence, let us not despair, but seek diligently to analyze the many facts that practical experience presents every day, and light will eventually dawn upon these obscure subjects.

EXCESSIVE HÆMORRHAGE OF SEVERAL HOURS DURATION, BEGINNING TWO AND A HALF HOURS AFTER EXTRACTION OF SENILE CATARACT.

BY DR. B. E. FRYER, U. S. A., KANSAS CITY.

Every ophthalmic surgeon has met with cases in which either during or after the removal of cataract there was more or less bleeding of short duration, but I think that cases like the following in which the hæmorrhage was not only excessive, (when its source is considered,) but also of long continuance, must be infrequent, and sufficiently so to warrant record.

The subject of this cataract was a Mrs. D., aged 75 years, of Irish birth, spare habit, but fairly well nourished for her age. Patient first came to me Nov. 10, 1887. I found she had cataract in each eye, both of them hypermature. General health good: no history of syphilis or rheumatism.

The field of vision was good, though the perception of the light used in making the test indicated V. to be below normal for the condition. The pupils could not, it was found, be fully dilated, and were not expanded over a fourth even after the use of atropine for some days. It was decided to extract the cataract of the right eye. Operation was done Dec. 15, 1887. Atropine instillations had been used up to within four days of the operation. A drop of a one per cent. solution of Merck's cocaine was instilled into the eye every twenty minutes prior to the operation, until five instillations were had. Then just before the operation a few drops more were placed in each conjunctival sac.

The incision was made with a Graefe knife, very keen in point and edge. The wound was wholly in the cornea—about two-fifths of its upper portion being included in the cut, which

latter was very smooth and the line of its curve symmetrical, and without the slightest raggedness. In making the iridectomy the iris tore slightly at the first attempt at seizure by the forceps, but at the next trial a sufficient part of it was brought out and snipped off smoothly with Wecker's iris scissors. A small iridectomy only was made. A mere tinge of blood followed this, but not enough of it went into the anterior chamber to interfere with a full view of the lens while making use of the cystotome, and the lens was delivered through the incision with but very slight pressure by the vulcanite curette. No presentation or escape of vitreous, and no flattening or wrinkling of cornea followed, and there was no blood visible in the anterior chamber.

A rapid test observed that fingers were readily counted. The eyes were placed under the usual dressing and the patient put quietly to bed.

About two hours and a half after the operation the woman felt a sharp pain in the operated eye, which continuing, she called the nurse (one of experience in the nursing of eye cases), and the latter at once observing that blood had oozed through the dressings, and was running down the face, removed the bandage and began gently wiping the blood from the cheek and lids.

The bleeding continued until I saw the patient four hours after it had begun. The dressing which had been reapplied just before this, was saturated with blood. On examining the eye I found that the lips of the wound were pressed apart by a clot the whole length of the incision, and blood was oozing from about this clot quite rapidly. The clot I carefully removed, and cleansed the conjunctival sac, and applied the dressing, making some pressure with the bandage. This checked, but did not completely end the bleeding.

The blood appeared to come from the stump of the iris or behind it, but this was, of course, somewhat of a conjecture. The blood was mainly arterial. I saw the patient the next morning when the hæmorrhage had ceased, though, from the saturation of the dressing, it had probably lasted in a lessened

amount for some time after the application of the last bandage. Examination now revealed another though smaller blood clot in the wound lips, which was removed; anterior chamber full of blood. V. obliterated.

Examination of the eye now, seven weeks after the operation, shows it to be somewhat shrunken, the conjunctiva bulbi of a dark purplish red, the cornea of correct conformation, but semi-opaque. V. entirely gone.

The source of the hæmorrhage was in all probability from the stump of the iris. No unusual traction however, had been made on this membrane during the iridectomy or at any time, and no bruising occurred at the delivery of the lens. In fact the whole operation, in all its steps, was very regular and smooth, and during it the patient was calm and quiet, and gave no trouble.

It is to be hoped that other operators who may have had similar experience as that furnished by this case, may put it on record also.

THE NATURAL HISTORY OF STRABISMUS CONVERGENS.

BY JAMES LAUNCELOT MINOR, M. D., MEMPHIS, TENN.

Amongst the laity, and the general practitioner as well, the idea is entertained that "children often out-grow their squint;" but we, as ophthalmologists, have been taught by both precept and example, that operative measures in early life, are imperative for the correction of convergent strabismus.

Evidence is not wanting, however, to show that some of our number are dissenters from this view. I was impressed with this fact at the meeting of the American Ophthalmological Society in 1885, where Dr. Seely thus expressed himself on the subject, "When we look over our statistics, what per cent. of immediate results are more than cosmetic? My early conviction, *that something should be left for time and glasses*, long since grew into an absolute law of action, for I became thoroughly persuaded that *immediate perfection* meant *later in life, insufficiency or even divergence.*"

A study of the natural history of the affection will probably throw some light on the subject; and with this idea in view, I have collected the notes of such cases as I have seen. They are brief and incomplete, and the number is small, for they were discovered accidentally; nevertheless, they will serve the purpose of illustrating the main features of the affection. I present the notes of six cases of convergent squint, none of which received treatment of any kind—each case was left to itself, and in every instance, the ultimate result, was a practical correction of the deformity.

Four cases had refractive errors, of the hyperopic type. One had an intra-ocular lesion, and one, corneal opacity. How frequently a spontaneous correction occurs, it is impossible to

state, for my cases were discovered accidentally, but it must be rare. This small number, is, I know, too small to admit of general conclusions, but it shows that there is foundation for the popular belief that squint does sometimes correct itself. It may be urged, that if correction occurs without treatment, the benefits conferred by operative measures in early life, are not only transitory, but may be followed by over-correction—divergence—later on. Yet this does not necessarily condemn the operation, for the number of spontaneous cases is small; and the period of waiting and uncertainty is objectionable. And too, those who believe in the theory of *amblyopia ex anopsia*, claim to re-establish binocular vision by an operation, and thereby prevent or improve faulty vision, and prevent a return of the squint. If the effect of the operation is purely cosmetic—as I believe it to be in the majority of cases—an operation in early life is advisable, because of the good it confers; immediate benefit can be certainly obtained, which will, in all probability be permanent; and if in after years there should be over-correction, temporary relief will have been obtained, and a second operation may secure final correction.

So far as insufficiency of the recti muscles is concerned, my experience does not enable me to speak; but as the muscular condition is faulty to begin with, operative measures would not necessarily give rise to asthenopic symptoms, for I have seen these symptoms in cases of permanent squint, where nothing had been done except the wearing of correcting glasses, and the glasses did not afford perfect relief. Atropine and glasses do correct some cases of squint, but when these agents fail, recourse must be had to tenotomy.

Case I. M. C., female, æt. 46, years. Seen Sept. 1884, at New York Eye and Ear Infirmary. Strabismus convergens appeared in early childhood, and remained until she was twenty years old, when it began to diminish, and finally disappeared permanently ten years ago. The left eye was the squinting one. The eyes are now perfectly straight, and act in unison.

Diplopia was never experienced, nor can it be produced.

O. D.+5 D. S. V=$^{20}/_{xx}$ O. S. V=$^{10}/_{cc}$, which cannot be improved. Ophthalmoscope shows hyperopia of 5 D. O. U. and no abnormality of the fundus of either eye. Treatment was never sought before, and she now comes for glasses.

Case II. P. D., male, æt. 16 years. Seen by me at Dr. H. D. Noyes' office, in New York, in 1884. Convergent squint—the right eye turning in—appeared during infancy, and remained until two years ago, when it disappeared, and has remained permanently absent since. The eyes are straight and they act in concert, never had diplopia, nor can I produce it. O. D. V=$^{20}/_{cc}$. O. S. V=$^{20}/_{xx}$. Ophthalmoscope, shows, in *right eye* a patch of retino-choroidal atrophy, about the size of the optic disc, near the macula lutea—otherwise normal. *Left eye* normal. *Both* eyes emmetropic. Treatment was never sought before, and he now comes for conjunctivitis.

Case III. The notes of this case are furnished by my friend Dr. D. C. Cooks, of New York. E. K. æt. $15^{1}/_{2}$ years, female. Seen, May 1880, for asthenopic symptoms—was cross-eyed when four years old. The eyes are now straight, never received treatment. O. U.+10 s. V=$^{20}/_{xxx}$. Ophthalmoscope shows hyperopia $^{1}/_{8}$. Fundus normal O. U.

Case IV. F. D., male, æt. 50. Seen at my office in New York, June 1885. Eyes became crossed in childhood, and remained so until he was about twenty-five years old. They have been straight ever since. He began the use of glasses five years later, and has continued to wear them. O. D.+2. D. s. ⌒+1.50 D. c. axis 6.5°. V=$^{20}/_{xxx}$ O. S.+2.50 c. ax. 15° ⌒—2. D. c. ax. 105° V=$^{20}/_{xl}$. The left was the squinting eye. Ophthalmoscope shows refractive error only.

Case V. J. B. æt. 30, male. Seen in Memphis, Oct. 1886. Cross-eyed in early life, but for the past 14 years, the eyes have been parallel. The left eye was the squinting one, with which he has never seen well. Never had diplopia, nor can it be produced. O. D. V=$^{20}/_{xviii}$, and refraction emmetropic O. S. $^{10}/_{cc}$., no improvement with glasses. Ophthalmoscope shows high degree of irregular astigmatism. Never received treatment before, and comes now for conjunctivitis.

Case VI. D. P., female, æt. 20. Seen in Memphis, July 1887. Was cross-eyed when a child, and remained so until she was about 16 years old. Eyes now parallel, and act in concert. Has binocular vision. O. D., the eye which squinted $V=^{20}/_{xl}$. Unimproved with glasses. Slight haziness of cornea, and emmetropic. O. S. $V=^{20}/_{xx}$ and emmetropic. The right eye was sore in early life—probably an ulcer of the cornea—which caused the squint.

FITTING SPECTACLE FRAMES TO THE FACE.

BY EDWARD JACKSON, A. M., M. D.,

Professor of Diseases of the Eye in the Philadelphia Polyclinic.

A Clinical Lecture.

Gentlemen:—Most of you, who enter upon the practice of ophthalmology outside of the larger cities, will be compelled to furnish patients with glasses. You will be unable to find any jeweler, or optician, fitted by previous experience to take charge of your prescriptions, or ready and willing to fit himself for the work. And you can undertake this in strict confirmity to the highest standard of ethics, by practicing simple honesty. Do not attempt to attract the unthinking, by having it understood, that you do not charge for examining the eyes, but only for the glasses. But fix definitely your scale of professional charges, and look to these, and to these alone, for recompense for your professional services.

Then if glasses are needed, and the patient has no better way of obtaining them, get them for him, and charge him just the ordinary retail price that he would be charged by any honest competent optician. Adhere rigidly to this rule, and when the expenses are paid and the time and annoyance counted, the discount allowed by the wholesale optican will be no temptation to advice the getting of glasses that are not needed. There is nothing discreditable or beneath the dignity of the profession, in furnishing to a patient who cannot so well get themin any other way, the glasses he needs, at the regular market price. But it is dishonorable, unprofessional, swindling, for a doctor to take advantage of his patient's confidence and ignorance, to extort from him more money for a pair of glasses than those glasses or worth; or to pretend to charge for glas-

ses, when he is really charging for something else. And no man will keep his professional judgement thoroughly honest and clear-sighted, who makes the compensation for his professional labor dependent upon the sale of a pair of glasses.

But even if you are not compelled to furnish glasses, you will find it worth your while to see that each patient for whom they are ordered has them properly fitted ; so that a good understanding of this subject is of practical importance to all.

The function of the frame is to place and retain the glass in the proper position before the eye. As a rule, it is performed best by spectacle with what are known as "hook-temples," while eye-glasses are the least satisfactory, especially for cylindrical lenses. But in advising as to the selection of frames it should be remembered, that the lenses do good only when worn. And if one kind of frame would be worn sometimes when others would not, the fact constitutes a great advantage for that particular kind of frame, to be carefully weighed against any disadvantages.

The frames should be so adjusted that when the glasses are in use the visual axes shall pass through the centres of the "eyes" or a little to the inner side of the centres. The portion of the "eye-wire" or edge of the lens next the nose, on account of the normal limitation of the field of vision in that direction, is less noticed and less annoying, than the part toward the temple. Hence it is better to have the frames a little too wide than a little to narrow. To determine the proper distance between the centres of the glasses, we measure the distance between the centres of the pupils; by holding in front of the eyes, parallel to the front of the face and as close as possible, a scale with its zero at the centre of one pupil, and note which division of the scale is opposite the centre of the other pupil. While this distance is being measured the eyes should be directed toward some distant object; and as the observer's eye is necessarily not more than two or three feet away, the distance obtained on the scale will be a little less than the true distance. So that if the glasses are to be used for distant vision, it is proper to add a millimetre, or one-sixteenth of an inch.

But if they are to be used at less than two feet, the same distance may be subtracted. To ascertain if a given pair of frames are of the proper width, we are not compelled to measure from the centre of one "eye" to the centre of the other; but may obtain just the same distance by measuring from the right side of one to the right side of the other. You will understand, of course, that what I am saying of centres refers only to the frames, and not to the mounting of the glasses in the frames, although in most cases the optical centre of the lens is made to correspond to the centre of the frame.

The height of the frames before the eyes should of course be such that there will be the least liability to look over or under the glasses. This height is determined by the work for which the glasses are to be used, and the relative heights of the bridge of the nose and the "bridge" of the frames. The higher the bridge of the nose the higher it raises the frames. But the higher the "bridge" of the frame, the lower it allows the "eyes," and the glasses they contain, to fall. The proper height for the bridge is to be found by trying on a pair of frames. The nearer they are to fitting, the better; but those which are very far from fitting are better than none for this purpose; and then measuring how much too high, or too low, the "eyes" come, and making the necessary correction for height.

In trying frames for this purpose, care must be taken to place the bridge in what might be called its "natural" position, the position toward which it will always tend when the frames are worn. For if fitted to any other position it will be continually getting out of place.

The height of the bridge is measured from the line joining the centres of the glasses, or what is the same thing, the line running from the joint where the temple is attached to the "front" on one side, to the same joint on the other side. To measure this height lay the spectacles, front downward, so that a ruled line or the bottom of a sheet of paper shall just pass from joint to joint; and measure up from this line to the centre of the bridge.

As a rule the glasses should be far enough in front of the

eyes to avoid being touched by the lashes; because if they do touch, the glass quickly becomes soiled. Ossasionally, however, persons who are strongly myopic prefer to have their glasses as close to their eyes as possible, since they are able thus to obtain larger, clear retinal images, than with the stronger lenses which would be necessary if placed farther from the eye.

Again, in high hyperopia, especially if associated with amblyopia, it is sometimes worth while to place the glasses further from the eyes than would be necessary simply to escape the lashes, in order to obtain the larger retinal image given by removing the correcting lens in that direction.

The adjustment of the frames in this direction is accomplished by putting the centre of the bridge "out" or "in" from the plane of the glasses. When the bridge of the nose is prominent, or the eyes deep-set. the bridge of the frames must extend well forward, or "out." But if the nose is flat and the eyes relatively prominent, the glasses must be carried forward by bringing the centre of the bridge "in." To determine this dimension of the frame, we again try on a frame. Placing the bridge in its "natural" position we note, if the lashes touch the glass, how much it must be carried forward to escape them or if they do not touch, how much closer it might be brought, without coming in contact with them; this distance giving, in connection with the distance "out" or "in" of the bridge tried, the dimension for the frame that will be suited to this particular face.

Thus the width between the centres of the glasses, their height, and their distance in front of the eyes, all depend on the shape and size of the nose-plate, or "brige." Various styles of bridge are made, the most generally useful being the one called "saddle bridge", which is made of various sizes and patterns, and which is capable of wide and accurate adaptation to the needs of the individual case.

There are other adjustments which do not depend upon the shape of the bridge; although, at first glance they might be expected to do so. First, the plane of the glass should be per-

pendicular to the direction of the visual axis, or as nearly so as may be. For distant vision the glass should face directly forward, while for ordinary reading, writing, etc., the glass should face decidedly downward. Now, the direction in which the glass faces is determined by the angle which the temples make with the plane of the glasses. When the temples are perpendicular to this plane the glasses look forward, when the temples are turned down the glasses look rather downward.

Again, to have both glasses the same height before the eyes, the temples must be equally turned down. If one glass always inclines to fall lower than the other, it becomes very annoying to the wearer, not only because the eye-wire is constantly seen double, but also because the difference in height of the optical centres of the two lenses gives the effect of a prism with its base up or down, liable to cause symptoms of eye-strain.

When this defect in the fitting of the frames is noticed it is to be remedied by bending down the temple attached to the glass that falls too low, thus throwing the glass up, or by bending up the temple attached to the glass that rides too high, and so bringing that glass down to the level of its fellow.

If the lashes touch one glass but not the other, showing that one comes closer to the eye than the other, the fault generally lies in the fact that one temple is bent out more, diverges more than the other; the glass on the side of the divergent temple tending to come too close to the eye. This is to be remedied by making the direction of both temples perpendicular to that of the "front", or equally and slightly divergent as they go back.

When spectacles are first worn, especially if they are worn constantly, they are apt to make the skin somewhat sore at such points as they come in contact with it. They should, therefore, be fitted rather loosely at first; and after a time, when the skin has become accustomed to the pressure they may be tightened up. Hook-temples should, when first adjusted, touch the temples, without making undue pressure. They become more widely spread as they are worn. When

hook-temples are left too loose they allow the glasses so slip too far on the nose, even when the bridge has been properly adjusted, but, on the other hand, if the bridge has been made too high, so that the glasses fall too low when it is in its "natural" position, no amount of tightening the temples will cause the glasses to keep their place.

I have not called attentian to the peculiarities of the faces which we have been fitting to-day, because the variety of faces is infinite, and they cannot be profitably considered in groups. You must master the general principles of the work, and then make each individual case a special study.

Let me remind you that it is important that the frames should fit, not only at first, but as long as they are worn When a patient comes with a history that glasses at first satisfactory are so no longer, do not at once conclude that his refraction, or the state of the recti muscles has changed. But as you enquire whether a prism or a cylinder has been out of the frames at some time and misplaced, notice whether the frames will keep the lenses in their proper position.

TRANSLATION.

EXTERNAL OPHTHALMOPLEGIA FOLLOWING DIPHTHERIA OF THE THROAT.

BY DR. O. EWETSKY.

Archives D'Ophtalmologie, Nov.–Dec. 1887.

Among the affections of the eye which we observe as sequels of diphtheria of the throat, the paralysis of the ciliary muscles is the most frequent. The paralyses of the external ocular muscles are rare, and according to Alfred Graefe, their existence is directly dependent on the character of the epidemic. This author who practices in a country which is frequently visited by diphtheria, has had occasion to see two cases only, one in which the superior oblique muscle was paralyzed, and another in which the two abducens muscles were inactive. On the other hand Pagenstecher has seen a great many paralyses of the muscles of the eye during a widely spread and prolonged epidemic. Recent observations made in Hirschberg's clinic and published by Remak, have also shown that the paralyses of the muscles of the eye are more frequent than has so far been admitted. To 100 cases of post-diphtheritic paralysis of the accommodation, there have been found ten cases of paralysis of one or the other of the external muscles. In the same way Rosenmeyer has found two cases combined with paresis of the two external recti in ten cases of paralysis of the accommodation.

In extremely rare cases all the external muscles of the eye are paralyzed from diphtheria. Such cases have been described by Uhthoff and Mendel. The rarity of such cases prompts me

to publish a new observation; but before describing it I will shortly report the two cases of these authors.

Uhthoff's Case.—A small boy, ten years of age. The diphtheria of the throat lasted from the first to the seventeenth of September, 1883, and was followed by paralysis of the palate. Towards the end of the same month paralysis of the accommodation. On the 10th of October paralysis of the external muscles of the eye, and a few days later total immobility of both eyes. On both sides slight ptosis, pupils normal and reacting well to light. Hypermetropia 2–D, V=1. No change in the fundus, paresis of accommodation. Later on very marked paresis of the lower extremities, total absence of the knee-jerk, normal sensibility, slight sensation of weakness in the upper extremities, no ataxia. Towards the end of October return of the accommodation to the normal, the paralysis of the ocular muscles lasted about one month. A little later the lower extremities became normally active, the knee-jerk, however, only returned in January 1884.

Mendel's Case.—Little boy, eight years old. Diphtheria of the throat lasting from the 22d to the 28th of September 1883. On the 4th of October paralysis of the palate. On the 2d of November sight impaired and weakness of both the upper and lower extremities. Ptosis on both sides. On the right side paresis of the external, superior and inferior recti muscles; on the left paresis of all the recti muscles, no paralysis of accommodation. Further on paresis of the right facial-nerve and the nerves of the neck, paralysis of the palate, trembling of tongue, ataxia of the upper and lower extremities with conservation of the muscular force, normal sensibility throughout, exaggerated sensibility for pain in the lower extremities. Absence of the knee-jerk, persistence of all the skin reflexes over the whole skin. Pulse 100, temperature 38 (Cels.). Death on Nov 11th, with symptoms of paralysis of lungs, ten days after the appearance of the paralysis of the eyes.

At the microscopical examination of the brain a considerable hyperaemia of the small arteries and capillaries was found from the anterior corpora quadrigemina to the crossing of the

pyramides, and in different places numerous extravasations, one of which in the right abducens nerve near the pons Varolii. No changes were found in the walls of the blood vessels, their lumen was nowhere obliterated, no changes in the cells of the nuclei of the common oculo-motor, nor the abducens, the pneumogastric, or hypoglossus nerves. In the muscles of the common oculo-motor nerve the cells were enlarged and looked as if inflated. In the nerves of the base of the brain manifest signs of an interstitial and medullary neuritis were found in the shape of an increase of the nuclei of the neurilemma and changes in the myeline sheaths.

I now proceed to the description of my own observation.

L. F., eight years old, was brought to me at the dispensary of the Society of Russian physicians on the 25th of November 1886. At first sight one is struck by the ptosis of the upper lids which veil-like cover almost the whole cornea. Only with a very great effort the patient can uncover a small portion of the pupil. At the same time the longitudinal folds of the forehead become more visible which shows that the frontalis muscle does part of the lifting. This action of the frontalis is the more manifest when, the eye being closed, the skin at the superior margin of the orbit is compressed with the finger, and thus the trasmission of the contractions of the frontalis is annulled. The patient is then totally unable to open the eyes. From this it is evident that the patient suffers on both sides from a complete paralysis of both levator palpebrae superioris muscles. This paralytic ptosis forces the child to throw the head back in order to see at least the objects which lie at a level with the eyes. The external aspect of the eye-balls is unchanged: conjunctiva, cornea, and iris are normal. The pupils are equal, a little more dilated than normal and react well to the light. The chief trouble lies in the loss of motility. The movements of the eyes upwards and downwards are absolutely impossible. The eyes can be moved horizontally, but to a very limited degree. The patient corrects this lack of motility of the eyes by corresponding movements of the head. Emmetropia in both eyes; V. L.=$^{15}/_{xx}$, R. E=$^{15}/_{xxx}$.

With both eyes patient reads the finest print at less than ten centimetres. The visual field and color-sense are normal.

The patient speaks with a very pronounced nasal twang, so that it is difficult to understand her. This symptom had come on at the same time with the eye-symptoms. There is a complete paralysis of the palate, the uvula is motionless without inclining to the side. The mucous membrane of the throat is insensible to the touch. Dr. A. Botkine to whom I directed the patient found that in all other respects her nervous system was normal.

Since this ophthalmoplegia with paralysis of the palate reminded me of the already mentioned cases of Uhthoff and Mendel, I supposed that the etiology was the same. And, in fact, the mother stated that two weeks previously the little girl had complained of a sore throat with pain during the act of deglutition, but that it had passed off in two days and had qeen apparently of so little importance, that she did not even stay in bed. Three days before the ophthalmoplegia occurred, she complained of head-aches, which ceased with the first appearance of the ophthalmoplegia. The latter commenced on the evening of the 21st of November, as on this day the family for the first time noticed the nasal twang and the change in the eyes. The child, as the mother expressed it, had sleepy eyes, but she could still lift the lids. On the 23rd the ptosis was more pronounced as also the nasal twang. The affection, therefore, had been in existence for four days only and had attained the degree of development above described within so short a period. I should mention yet, that the father had had syphilis, that the child had been born at full term, that when five months old she had some kind of a skin-eruption, but had not suffered from any disease since.

I prescribed small doses of iodide of potassium. The affection progressed in the following way:

Nov. 28. Less ptosis; the free margin of the lids can be raised to the middle of the pupil; small amelioration in the mobility in the horizontal, and very slight mobility in the vertical direction. The nasal twang less pronounced.

Dec. 2. The lids are raised to the upper edge of the pupil, lateral movements more free, motility upward and downward as yet very insignificant. Pronunciation better.

Dec. 9. No more ptosis, motility of left eye perfectly normal; in the right eye paresis of the internal rectus and consequent paralytic divergent strabismus. Nasal twang gone. Palate moveable, the mucous membrane of the throat sensitive.

Dec. 23. Position and motility of both eyes perfectly normal.

We have here a case in which after an undefined morbid process in the throat was developed simultaneously with paralysis of the palate, a paralysis of all the external muscles of the eyeball, while the sphincter of the pupil and the muscles of accommodation remained completely intact. Such a paralysis concerning solely the external ocular muscles is called *ophthalmoplegia externa*, in order to distinguish it from the paralysis of the sphincter of the pupil and the ciliary muscle, which is called *ophthalmoplegia interna*.

Among the different causes of the external ophthalmoplegia, as before mentioned, in rare cases, diphtheria of the throat plays an important role.

Doubtless our patient had suffered from an affection of the throat, yet it is difficult to determine, whether the nature of this process was diphtheritic or simply catarrhal. The answer to this question is the more difficult, since for some time there has been a tendency among physicians and oculists, and which becomes more and more pronounced, to attribute also to a simple angina the faculty of producing subsequently a paralysis of the accommodation and of the nerves. During the throat affection the little girl had not been under the observation of a physician. We know only that the disease had lasted but two days, and that it was so little intense that the child did not even stay in bed, in fact, had afterwards forgotten that she had been affected with angina. Since the apparent lightness of an angina does not suffice to prove that it was not of a diphtheritic character, and since the fact that a simple angina

can subsequently produce paralysis is not as yet firmly established, I am constrained to consider the throat affection of our little patient to have been a light diphtheritic angina.

Since, however, according to Hutchinson, an ophthalmoplegia externa may be due to hereditary syphilis, we will consider the possibility of this etiological factor.

The ophthalmoplegia due to syphilis is of a progressive character; when left alone without treatment it results in death. Only very large doses of iodide of potassium, continued for a prolonged period, can arrest the process, but there is never a complete cure. These few remarks are sufficient to prove that in our case the ophthalmoplegia, which was acute in its onset and healed so well, can not have been due to hereditary syphilis.

The case I just reported is distinguished from the two preceding ones by certain peculiarities to which I want to call attention. The three patients, two boys and one girl, were about of the same age.

It is evident that the lightest form of diphtheria, as for instance in our case, can produce a complete paralysis of all the external muscles of both eyes. In the other two cases the diphtheria had also been of a light character, even in the fatal case of Mendel the local affection was of a moderate degree. In these two cases the local process was almost instantly followed by paralysis of the palate, to which, after three or four weeks, was added the paralysis of the ocular muscles. In my case the paralysis of the palate and the ocular muscles came on simultaneously after the affection of the throat. In two cases the internal muscles of the eye were in no way affected; in Uhthoff's case, there was also a paresis of the accommodation. It is interesting to observe that this paresis did not come on simultaneously with, but two weeks in advance of, the paralysis of the external ocular muscles. The paralyses of the muscles of the eye are developed rapidly, and in a few days they reach their height, yet unfortunately we do not know in what order the different muscles become affected. That is, we do not know whether the loss of motility of the eyes takes

place in the sense of associated movements to the right, to the left, upward or downward, or whether the paralysis progresses gradually in the muscles which are supplied by one and the same nerve. In Uhthoff's case the order in which the movements were re-established was in the sense of the associated movements.

In my case only was the ophthalmoplegia the sole sequel (not counting the paralysis of the palate) of the diphtheria. In the other cases there was ataxia of both extremities and loss of the knee-jerk. In Uhthoff's patient the paralysis of the accommodation disappeared before an improvement could be noticed in the motility of the eyes. Morever, in his case the paralysis of the external muscles of the eye lasted about four weeks—in my case a much shorter period. In Uhthoff's case the atactic symptoms disappeared still much later, about two months after the disappearance of the re-establishment of the normal motility of the eyes; in the same time the knee-jerk also reappeared.

My case, then, differs from those related above by the light form of the local affection in the throat; by the promptness with which the ophthalmoplegia appeared, which came on simultaneously with the paralysis of the palate; by its rapid appearance and disappearance; and finally by the absence of any further complication on the part of the nervous system.

At this date it is generally accepted that the lesion of the motor nerves of the eyes in external ophthalmoplegia is situated in their nuclei. In assuming any other situation it would be difficult to explain the isolated existence of an exclusive paralysis of the external ocular muscles, while the internal muscles of the eye, whose nerves in the trunk of the common oculo-motor nerve lie by the side of the other paralyzed branches, remain perfectly intact. Aside from this purely theoretical consideration, a large number of very important clinical observations supports this opinion, as, for instance, the complication of ophthalmoplegia with bulbar paralysis. Although I fully agree with this view, I must not forget to remind my readers of the fact that in the opinion of a great many neuro-

pathologists the diphtheritic paralyses are due to a multiple neuritis; in consequence, in their opinion these paralyses are of a peripheral, not of a central origin. It is plain with what difficulties we must wrestle when we try to locate the lesion of the motor nerves of the eyes in diphtheritic external ophthalmoplegia. Mendel's case, above described, decidedly points toward a peripheral origin of the diphtheritic opthalmoplegia. The anatomical examination of the nuclei of the motor nerves of the eye, both of the common and the external one (abducens), was negative in its result; the nerve cells of the nucleus of the common oculo-motor nerve were found to be considerably increased in number, a condition which, according to Charcot, denotes the first stage of a medullary inflammation. In examining the nerve trunks the symptoms of an interstitial and a parenchymatous inflammation were found all over. The absence of a paralysis of the muscle of accommodation and of the sphincter muscle of the pupil, in spite of the inflammatory process in the trunk of the common oculo-motor nerve in this case, remains unexplained.

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EXCESSIVE HÆMORRHAGE AFTER CATARACT EXTRACTION.

BY F. C. HOTZ, M.D., CHICAGO.

Such cases like that reported by Dr. Fryer in the last number of this journal, are fortunately very uncommon indeed; and very little must have been published about so grave an accident as the occurrence of profuse and disastrous intra-ocular hæmorrhage after cataract extraction. For otherwise I cannot understand why the text-books are so surprisingly silent about it; even the large handbook edited by Graefe and Saemisch does not mention it, though it gives elaborate descriptions of the operations and enumerates the accidents which possibly may occur during and after the operation. This is surely very strange, for among all the accidents we can scarcely imagine any one more shocking than this one, and it is the more exasperating because it usually occurs after a regular smooth operation when we least anticipate any trouble. At least in all cases which have come to my knowledge the operation has been normal and the immediate test of vision satisfactory.

I had no personal experience of this kind until last fall when I lost two cases by this terrible accident.

The first case was a patient aged 54, in the Illinois Eye and Ear Infirmary. Mature cataract in left eye; Graefe's operation was performed under cocaine and sublimate August 21, at 2 p. m.; extraction normal in every respect; pupil clear and black; patient could count fingers readily after the operation. About 9 p. m. he had a violent attack of vomiting and diarrhœa followed by severe pain in the eye and head and oozing of blood through the bandage. The house-surgeon renewed the dressing several times during the night, but when I saw the patient in the morning the bandage was again thoroughly saturated with blood; and on removing it I found the whole vitreous streaked with blood outside of the wound. In spite of moderate pressure bandage the bleeding continued the whole day. A mild form of panophthalmitis supervened and atrophy of the globe closed the drama.

The second case occurred in private practice. The patient with mature cataract of both eyes was a fleshy, stout lady of 66 years, much inclined to congestive flushing of the face.

Oct. 19, at 2 p. m., operation on the right eye; incision along the upper border of the transparent cornea; delivery of the cataract very easy and perfect; patient recognized at once her daughter and friends and counted my fingers easily. She went directly to bed and was perfectly comfortable when I visited her at 7 o'clock. But at 9 p. m. she was suddenly seized with violent pain in the eye and right side of the head, followed by nausea (but she did not vomit) and blood oozing through the bandage. On removing the dressing the wound was found widely open, the vitreous protruding, and the blood flowing in a continuous current. The hæmorrhage lasted all day; the whole vitreous was expelled; and after a long siege of inflammation the eye became slightly atrophic with the cornea transparent, and the anterior chamber restored, but the posterior cavity of the globe filled with a fibrinous mass.

The similarity of these two cases with Dr. Fryer's would be complete but for one point, to-wit, he does not mention the escape of the vitreous body. But could that not have come away with bloodclots and thus have escaped the doctor's

notice? It certainly does not seem at all probable that this excessive hæmorrhage should have come from the stump of the iris as the doctor thinks. It would be difficult to understand how a hæmorrhage from this source could induce the rapid degeneration of eye with all the characteristic signs of diffuse choroiditis. It is more likely that in his case, like in mine (and in those of Dr. Mooren I shall presently mention, the bleeding started behind the vitreous in the retina or choroid (probably, the latter) and caused the detachment and expulsion of the whole vitreous.

It may be in eresting in this connection to state the observations of the ophthalmic surgeon than whom very few have a greater experience in cataract operations. In his excellent résumé of twenty-five years of ophthalmic practice Dr. Albert Mooren says that in 2,872 cases of extraction he met but three times with this uncommon accident of disastrous intraocular hæmorrhage. "I made the first experience of this kind ten years ago with the eye of an old Spanish gentleman. The extraction of the cataract was perfectly normal, and I was just putting on the bandage, when suddenly the patient was seized with the most violent pain in the temples, followed by vomiting and blood appearing through and from under the bandage. Upon removing the bandage I found the entire vitreous body had escaped; and in spite of pressure bandage the blood continued to pour forth from the eyeball for 10 or 12 minutes. After the coagulated blood was removed the edges of the wound re-united, and the eyeball was preserved, but the whole choroid was detached.

The second case was an asthmatic lady. On account of her condition preliminary iridectomy was performed on both eyes; and 18 days later the cataract was extracted from the left eye. It was a perfectly smooth operation and the patient had been in bed 15 minutes, when suddenly her face became flushed and the left temporal artery was pulsating so violently that it was noticed by everyone around the patient. This was followed by violent temporal neuralgia and vomiting, and one minute later blood was seen oozing from under the bandage.

When this was removed the whole vitreous was expelled from between the eyelids followed by a profuse gush of blood. The pain ceased soon afterwards; but the bleeding continued five days.

About three weeks later the operation was done upon the other eye, The operating table was placed so that the patient could be lifted from it directly into her bed. Again the operation was perfect in every respect; but 15 minutes later the same redness of the face, the same temporal neuralgia with vomiting, hæmorrhage and expulsion of the vitreous. Both eyes became atrophied.

I know of no diagnostic means by which we could predict the occurrence of this awful catastrophe. The only sign indicating the possible morbid condition of the arterial walls, is an unusual tortuosity and rigidity of the temporal arteries, though their condition is far from furnishing any positive indication that this terrible catastrophe is likely to occur. As it is, we must content ourselves with saying these accidents speak very strongly for Dr. Michel's opinion of the intimate relation existing between the formation of cataract and arterial sclerosis; for I have no doubt that the escape of the vitreous in these cases is caused by an intra-ocular hæmorrhage occurring at a moment when (after the extraction) the blood pressure within the arteries is not sufficiently counter-balanced by the pressure of the contents of the globe." (Fünf Lustren ophthalmologischer Wirksamkeit, von Dr. Albert Mooren, 1882.)

ATYPICAL ALCOHOLIC NEURITIS.

BY H. GIFFORD, M. D., OMAHA, NEB.

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Under the title "*Pseudo-Atrophies de la Papille*," Trousseau[1] has reported four cases of toxic amblyopia, three from alcohol and one from tobacco, in which, instead of typical atrophy of the outer half or quadrant of the disc, the whole papilla seemed atrophic. In one of these there was no central scotoma, but a decided contraction of the field; and this, with the occurrence of other tabetic symptoms, made the prognosis most grave. Nevertheless, in this as in other cases abstinence and strychnia caused a marked and permanent improvement in the sight and, in three of these cases, the papilla regained its normal aspect.

The following is a similarly exceptional case:

Sept. 21, 1886, S. B., æt. 58, middle-sized man of fair vigor. More than a year ago sunlight began to dazzle his eyes more than usual. Soon after, noticed cloud in the centre of left field. This has been getting denser since. About a year after affection of L. E. noticed similar cloud before R. E. For six years has used alcohol and tobacco to excess. No history of syphilis. Stat. præs. Pupils very small; that of L.E. smaller. Contraction of pupils to light or accommodation so slight as to be doubtful. Media clear, whole papilla in each eye slightly, though distinctly atrophic; more so in L. E.—R. E. V=$^{2}/_{1}$ +, excentric. Glasses = 0. Oval scotoma at centre of field from 5° at nasal side to 10° at temporal side. At centre scotoma is absolute, toward margins, white is recognized but colors not. Outer limits of field normal for white, no note

[1] Trousseau; Bull. de la Chir. Oph. de l'hosp. des Quinze-Vingt, V. 1, p. 45.

of color field. L.E.V=$^{2}/_{1xx}$. Field as in R.E. except that scotoma extends to 15° at the temporal side. A month or so ago had slight paresis of left side of mouth and of thumb and forefinger of left hand, with lameness of left radial muscles; paresis better now but still evident; knee-jerk very much reduced. Stands well with eyes closed. Has darting "rheumatic" pains but no worse than for years. Ord. abstinence, galvanism, strychnia. Prognosis, both as to improvement and retention of vision, very dubious, for, in spite of the alcoholism and the typical scotoma, the other symptoms, particularly the general atrophy of the papillæ and the long interval between the dates of the eyes seemed to exclude alcoholic neuritis and make probable the beginning of some general nervous trouble, if not tabes dorsalis, perhaps a disseminate sclerosis. October 6, goes East for a time. R.E. V=$^{2}/_{xl}$; L.E. V=$^{2}/_{l}$; scotoma about the same. Used strychnia pills and potassium iodide. Nov. 22, returned on his way home to Oregon. R.E. V=$^{3}/_{xxx}$; L.E. V=$^{2}/_{xl}$. Fundus unchanged. No record of field. Patient has had no difficulty in abstaining: continue strychnia and iodide with intervals of suspension. May 21 1887, reports by letter that sight has slowly but steadily improved till now with his old reading glasses, at ordinary reading distance R.E. reads "No. 1 Diamond" about. L.E. reads "No. 8 Small Pica." Cloud still in centre of left field. Sight much better sometimes than others. Still takes strychnia and potassium iodide at intervals. November 1, 1887, letters from patient and his physician report that sight is still clearer and steadier. Of late has had numbness at base of toes of left foot. Knee-jerk, especially left, still impaired. Pupils still small and nearly or quite immovable on exposure to light. Has maintained abstinence except for the moderate use of port wine (!)

As before mentioned, I was at first inclined to regard this case as one of incipient tabes. The impaired knee-jerk, the myosis, the paresis of the radial muscles, to which but a short time before Struempell [1] had called attention as an early symp-

[1]Strümpell; Berlin Klin. Wochenschr, 1886, 37.

tom of tabes; and the appearance of the discs all pointed in that direction. True, the field was directly opposed to this supposition. Förster[1] says that, in his experience, central scotomata contraindicate tabes; and Schmeichler[2] in his elaborate paper on the symptoms of tabes, practically pronounces them unheard of as a tabetic complication. Still, others speak of central scotoma as a very rare symptom of tabes, so I did not feel warranted in excluding the latter on this ground alone. However, the results of the abstinence and strychnia have convinced me that the whole trouble was a multiple alcoholic neuritis, though so far as the eyes were concerned, a very exceptional one. The general paleness of the nerve has not, so far as I can learn, been observed by any previous author except Trousseau. The myosis is also a rare feature. Bernhardt[3] says that myosis and reflex fixity of the pupil occur in alcoholic tabes rarely or not all. But the most unique feature of the case is its non-symmetrical developement. In his remarkably exhaustive monograph on the effects of chronic alcoholism on the eye Uthoff[4] states as one of the differential points between non-toxic retrobulbar neuritis and alcohol and tobacco amblyopia, that in the latter the affection always occurs simultaneously or with only a few day's interval, in both eyes. My patient is positive that there was at least six months and he thinks about a year, between the beginning of the affection in the two eyes. It is not impossible however that a slight scotoma in the second eye might have been overlooked for some time, as the patient was of an extremely easy-going disposition.

The fact that cases like the above and those of Trousseau occur, is of importance not only from their rarity but from a prognostic point of veiw. By giving broader views of the

[1] Förster; Graefe-Saemisch, VI p. 132.

[2] Schmeichler; Arch. f. Augenheilk, XII p. 458.

[3] Bernhardt; Ref. in Fortschritte d. Med. 1887, 13.

[4] Uthoff; v. Graefe's Arch. f. Oph. XXXIII, I, p. 310.

scope of alcoholic amblyopia they will occasionally enable us to make a much desired qualification of our prognosis.

FURTHER EXPERIMENTS WITH HYDROCHLORATE OF ERYTHROPHLEINE.

BY ADOLF ALT, M.D.

Since my last communication on experiments with the hydrochlorate of erythrophleine, I have used it in a $^1/_{10}\%$ solution in a number of cases with the following results.

This stronger solution acts, it seems, more equally upon the conjunctiva and cornea. The beginning of the anæsthesia can often be felt after one minute, always after two. I stated in my last communication that the cornea does not seem to become as markedly anæsthetic as the conjunctiva. The fact seems to be that, although the feeling of pain in the cornea (as caused, for instance, by the removal of a foreign body) is abolished, the feeling for the touch does not seem to be totally lost. Where three is an ulcerative process in the cornea the pain following the instillation of erythrophleine is enormous, and it can barely be reduced by the free use of cocaine.

In the healthy eye also the instillation of such a stronger solution of erythrophleine causes a very disagreeable amount of pain which seems to become worse, until about half an hour after the instillation, when it gradually subsides. Later on sight appears to be interfered with in most cases and this is due to a slight haziness of the corneal epithelium. Some people also see red and blue colored rings, as in glaucoma, the blue ring being inside of the red one. This I observed especially in older individuals.

I tried to perform a tenotomy on an eye under the influence of erythrophleine, but the patient complained of such pain that I had to resort to cocaine. I have since in several cases first used cocaine and when the eye was anæsthetic instilled erythrophleine, with the idea of prolonging the anæsthesia

and reducing the pain and irritation caused by the erythrophleine.

Without going further into details my experience with erythrophleine leads me to the following conclusions.

Merck's erythrophleinum hydrochloricum has an undoubtedly anæsthetic effect upon the conjunctiva and cornea.

It differs, however, in its action from cocaine.

Even in a weak solution it causes a very large amount of pain and irritation.

Although a diminution of sensibility is felt much quicker than with cocaine, a full anæsthesia with regard to painful manipulation is established considerably later.

The anæsthesia due erythrophleine lasts much longer than that produced by cocaine.

Erythrophleine does not influence the accommodation and has no influence on the sphincter pupillæ, unless it be a slight myosis.

The anæsthetic action of erythrophleine seems to be confined to the place which the solution actually touches. At least, I find, that unless I allow the solution to run over the whole of the cornea, the anæsthesia will remain confined to the lower part of the cornea with the solution will come in contact when instilled into the lower cul-de-sac.

From the foregoing it is, it seems to me, very doubtful whether erythrophleine, whatever advantages it may give to the surgeon in general, will be and can be very advantageously used in ophthalmic practice. So far cocaine is decidedly less disagreeable, and brings about a full and deep anæsthesia in a shorter time, and is, therefore, to be preferred. Where the prolonged duration of the anæsthesia is so much desired, that all other effects from erythrophleine are of less importance, it will be in its place, and its irritating qualities may be somewhat subdued by first putting the eye under full anæsthesia by means of cocaine.

ON THE INFLUENCE OF THE REMOVAL OF THE PUNCTUM PROXIMUM AND GREATER CORRECTION WITH CONVEX GLASSES IN HYPEROPIA.

BY H. CULBERTSON, M. D., ZANESVILLE, OHIO.

Professor Foerster, of Breslau, has published in Vol. XV, page 399, of the *Archives of Ophthalmology*, an article on the influence of concave glasses in retarding the increase of myopia, when proximal objects are observed at about 40 cm. from the bridge of the nose. He aims to employ the lowest concave glass giving distinct remote vision, but does not think it necessary to use concave glasses when the myopia is no greater than=—D 1.75. Soon after reading this paper I began to give full correction for all high grades of myopia and taught my patients to hold objects at 40 cm. from the cornea in vision near at hand. I soon found that this was a decided advantage, and in not a single instance has it been necessary to increase the power of the concave glasses, or discontinue the use of glasses so applied from discomfort attending their employment in near vision.

Having observed this practical result it occurred to me, that the principle of removing objects in proximal vision might be advantageous in hyperopia as well as in myopia, and proceeding thus, that, a fuller correction could be given primarily, without the danger of inducing artificial myopia when the+ correcting glass was applied in hyperopia. On testing this matter it was found practical. Without entering into a scientific demonstration of this subject, I will simply say that my belief is, that the successful result in these cases is attained by the diminution of accommodation induced by the removal of the

object from the eye, the convex glass performing the office of the ciliary muscle, and by its relaxation asthenopia is diminished and from the remoteness of the object convergence is rendered less.

I found that this plan does best in those whose age endows them with an amplitude of ciliary-muscle-power and in whom the relation of this force to the degree of hyperopia is no longer able to be sustained or compensatory. Full correction may not be given, but a larger per cent can be if the proximal object be removed to 40 c m.

To illustrate—a patient is 20 years of age, with=D 10. of accommodation and D 4. of hyperopia. Such an one to read at 10 cm. must exercise D 14. of accommodation which at this age is not ordinarily possessed, and hence the object must be removed=D 10.—D 4.=D 6.=16 c m. But even at this object distance,asthenopia is not relieved and the ciliary muscle is exercising its full force, whereas there should be a *reserve force* in this muscle before rest can be obtained and the evils of over-work obviated in the eye. If now the hyperopia be corrected with+D4. spheric, there will be found D 10. of accommodation. We now insist upon the patient reading at 33 cm; or but D 3. of accommodation are employed, and there remains, 10—3=D7. of accommodation unused. The eye is therefore at rest, convergence diminished and an opportunity given to restore the ciliary muscle to its wonted power, and to relieve the evils of asthenopia by rest. We may not be able to correct all the hyperopia at once in these cases, but if the object is held more distant from the eyes a greater degree of hyperopia can be neutralized, primarily. Such has been my observation.

The application of the convex glass will have a tendency to present that diminution of the object-image upon the retina arising from the proposed removal of the object in proximal vision.

There are then two factors tending to diminish the presence of artificial myopia when convex glasses are applied to correct hyperopia, viz., the natural impulse to relax accommodation,

and the reduction of the ciliary-muscle-force incident to the removal of the object from the eyes.

It may be asked if artificial myopia is induced in hyperopia by the presence of the convex glasses, should not the object be brought closer to the eye, thus giving greater obliquity to the visual rays of light, and hence casting the focus posteriorly upon the retina, why not make this approachment and correct the myopia in this manner? I would answer this, that, so far as I am able to judge, the very act of carrying the object nearer to the eye would increase the accommodation and serve to keep up the artificial myopia, while the removal of the object would naturally tend to diminish the acting force of the ciliary muscle, and therefore the degree of artificial myopia.

I have been using this plan for nearly a year and find it successful. I do not consider it necessary to report all my cases—two will serve as well as fifty, to illustrate this paper.

Mr. J. L. M. aged 18, has latent hyperopia shown by duboisia=+D3.5, and with these glasses V. Re=$^{4}/_{x1}$ Snellen. After the effects of the mydriatic had passed off V. R and L,=$^{8}/_{x1}$D and V with both eyes=D$^{6}/_{x1}$ Snellen. These glasses were comfortable.

Miss S. C. B. aged 21, has latent hyperopia=+D .25, each eye, developed under duboisia. After the effects of the mydriatic had passed off, these glasses were given and vision became comfortable in each eye and V with both eyes =$^{6}/_{x1}$ Snellen. Both of these and all my other patients were instructed to place the object at 35 to 40 cm. in near-vision.

AN OPERATION FOR SIMPLE FORMS OF ENTROPIUM.

BY FRANK ALLPORT, M. D.,

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There are at present so many operations for entropium before the profession, that I feel considerable reluctance in placing before its notice yet another.

For several years I have regarded Dr. F. C. Hotz's operation as the best and most rational procedure in use. I have in no wise changed my mind. I still claim superiority for his method when used in all grades of entropium. But I desire to place upon the record, another operation that appears to be equally efficient in a certain grade of cases, and possesses the invaluable quality of extreme simplicity.

It is in reality based upon the same principle as Hotz's method, in that it seeks to obtain union between certain of the soft tissues of the lid and the tip of the tarsal cartilage.

An anæsthetic (general) is not usually required, and as a rule not a drop of blood is evacuated.

A few drops of a 4 per cent solution of cocaine, sould be instilled on the conjunctiva until complete local anæsthesia is produced. The instruments required are a broad straight needle, a needle-holder, some strong, coarse black thread that should be doubled before using, a pair of forceps—and a pair of scissors.

By the aid of the needle-holder the needle armed with the double thread, should be inserted into the skin, midway between the internal and external canthus, and just below the upper boundary of the tarsal cartilage. The lid meanwhile should be held away from the eye-ball and slightly downward by means of the forceps, which should grasp the free edge of

the lid, midway between the canthi. The needle should now be forced directly through the lid, on emerging from the conjunctiva, from whence it should be pulled, until about four inches of thread remain on the outside of the lid. The needle should now be inserted into the lid from the conjunctival surface, and forced again directly through the lid. On emerging on the outer side of the lid, it should be pulled, and the suture snipped. The track of the two sutures should be side by side and about two lines apart, as shown in figure 2.

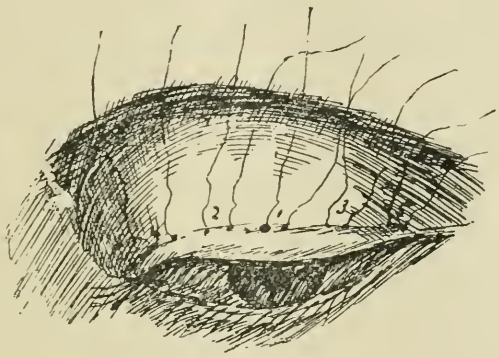


FIG 2.

1. First suture. 2. Second do. 3. Third do. 4. Fourth do. 5. Fifth do.

The loop-suture now includes principally skin, muscle, tip of tarsal cartilage, and conjunctiva. The two ends of the suture should now be tied as tightly and securely as possible, much care being given to this point.

Five sutures like this, should be inserted, and the lid dressed, with vaseline, cotton and a bandage. No effort should be made to subdue the inflammation, unless it be severe, as a certain amount of inflammation at the points of the sutures is necessary to the entire success of the operation. The sutures are allowed to remain for about a week or ten days days, unless there should arise contingencies, that would necessitate their removal. By this time it is hoped there will be sufficient adherence between the tip of the tarsal cartilage and the soft tissues anterior to it, to produce a turning out of the lashes.

As is well known it takes but a very small amount of pressure, applied with a probe to the skin overlying the tip of the tarsal cartilage to produce an eversion of the lid margin. This observation is involved in the operation, and in my hands it has been quite successful in thirty-one lids during a period of eight months. I have said "quite successful," for I have tried it in all cases, both mild and severe, and it has not accomplished satisfactory results in severe cases. But in mild and medium entropium, it has given entire satisfaction. It is a simple operation, as will be seen, and does not necessitate general anæsthesia. It is practically bloodless, involves no loss of tissue, no disfigurement, and may be done in the office while the patient sits in a chair. Possessing these qualities and its use being restricted to mild and medium cases, I think it will find a place among useful operations.

THE PERIODICAL INTERNATIONAL CONGRESS OF OPHTHALMOLOGISTS.

Seventh Meeting, Heidelberg, August 9th to 12th, 1888.

The ophthalmological society founded by A. von Graefe decided at the second meeting of its last year's session at Heidelberg, to celebrate its 25th anniversary in the year 1888, by inviting the ophthalmologists of all countries to take part in their session (beginning at the 9th of September 1888) and thus by their presence to change the yearly congress of ophthalmologists at Heidelberg into an International Congress. The necessary work to carry out the intentions of this decision was put into the hands of a committee whose names are signed to this communication.

We were enabled to take this task on our shoulders, as honoring as it is difficult, by the fact, that the ministry of justice, cultus and education of the Grand-Dukedom of Baden and the authorities of the city of Heidelberg had assured us in a most liberal way of their support.

It is therefore to be expected, that, in spite of the limited exterior facilities under which the congress will meet at Heidelberg, and aside from the scientific stimulus undoubtedly offered by a convention of so many excellent scientists, the guests will take away with them impressions of the city and the country of such a peculiar character, that they will not miss in too great a measure the lasting impressions received in cities like Brussels, Paris, London, New York and Milan.

In so bringing to the knowledge of the ophthalmologists and their friends the resolution of the ophthalmological society by means of the press, we think it necessary to enlarge on an important point, before making known the exact programm of the congress.

Can the Ophthalmological Society of Heidelberg call an international meeting, thus invited, the seventh session of the periodical international congress of ophthalmologists?

This question can only be decided by looking back into the history of the origin and the subsequent development of the *Congres International periodique d'ophtalmologie.*

The series of congresses of ophthalmologists began with the meeting at Brussels, September 13th to 16th, 1857. The first instigation was due to Dr. Warlomont, the editor of the *Annales d'oculistique*, which have appeared in Brussels since 1836. President Fallot in his inauguration-address attributes the success of convening the congress especially to him and to the extraordinary good-will of the minister of the interior, De Decker. The names of the vice-presidents which were elected with consideration for the states most numerously represented, show the international character of this congress. They were, James Dixon, Arlt, Melchior (Daenemark), Sichel, Stromeyer, Sperino, Donders, Marques (Spain), von Graefe, von Kabbath (Russia) and Ammon. Secretary was Warlomont. The number of participants was 160.

This meeting at Brussels was in fact the first international congress of ophthalmologists. We have the more right to call it so, since the first session of the *Societe universelle d'ophtalmologie*, chartered by the French government, March 1861, and held in October 1861, can, from a scientific consideration, hardly be called a congress (cf. Ann. d'ocul. XLVI, p. 243).

In the report of the second session of the *Societe universelle* held between the 30th of September and the 3d of October, 1862, Warlomont states, that the first meeting had been visited by a certain number of renowned foreign ophthalmologists (*un certain nombre d'ophtalmologistes etrangers de distinction,*) which came as private individuals or as delegates from their respective governments. (Of these there were 15 in all). Further on Warlomont says, that these prominent scientists on their arrival in Paris were not a little astonished to be the only ones, and to find but very few French colleagues at the place of meeting.

After having passed a few days in scientific discussions this meeting recognized it as its nearest and most important task, to reorganize the *Societe universelle d'ophtalmologie* on a new basis.

This was done at a meeting held October 13th 1861, in which the Parisian colleagues took part. It was then decided to meet yearly, not, however, always at Paris, but to change

the place of meeting, although for the ensuing year (1862) Paris was once more chosen. Ten cities lying in different countries were mentioned as being well-fitted to receive the society. Later on the permanent committee residing in Paris added 21 more names to this list.

The constitution, as recommended by the permanent committee at the first meeting of the second session of the *Societe universelle* (1862) was thoroughly discussed and adopted with some changes. The most important resolution was, that the sessions should take place every 4 years, instead of yearly. (The number of participants was 113).

This resolution prompted Warlomont to state, that the *Societe universelle* by adopting this interval of 4 years had changed its original character as a permanent society into a periodical congress. It was, therefore, necessary to adopt the name of *Congres international periodique d'ophtalmologie.* He further correctly added, that the session of 1862 must be considered as the second congress or even as the continuation of the Brussels Congress of 1857. "Too many ties unite this one with the Brussels session of 1857, not to make it appear logical, to view it as a continuation of the work in which so many excellent members of that meeting have already taken an active part."

Thus the Periodical International Congress of Ophthalmologists was founded in fact and in name.

Let us look at its further fate.

For the third meeting in 1866, Vienna was selected. In spite of the advanced state of the preparations made by the Vienna committee, it did not take place. The war prohibited it. The next year, 1867, again insuperable obstacles presented themselves. Therefore, Frederick Jaeger and Arlt handed back their mandates to the permanent committee of the *Societe universelle d'ophtalmologie de Paris*, which, in name at least, was still in existence, feeling confident that an invitation to Paris for the 3d session in 1867 would give general satisfaction, since the universal exposition anyhow drew the scientific world to Paris. The third session, called the second Paris congress, was accordingly opened on the 12th of August in the

Salle du Grand Orient de France with 114 members. Its splendid success, especially brilliant on account of Helmholtz's attendance, is well known.

At the meeting in the forenoon of the 14th of August the year 1871 was decided upon for the fourth session and Berlin as the place of meeting, since Arlt declined decidedly to have it meet at Vienna.

Again the fates of war had not been reckoned with. The death of von Graefe in 1870 made the success of the Berlin congress doubtful, the war impossible.

It was Critchett who at the Heidelberg meeting (Sept. 5th 1871) revived the international congress on his own responsibility. Without being especially delegated to do so, he invited the ophthalmologists present in his name and that of his English colleagues, to convene as an international congress in London in the following year (1872). The time should not be put later than August, since the September weather in London was dismal and dreary.

In his inaugural speech at the meeting of the fourth international periodical congress of ophthalmologists, (Aug. 1, 1872) he especially mentioned, that the reviving influence had come from the preceding meeting at Heidelberg. (The participants numbered 104).

The prominent English ophthalmologists, especially Bowman and Critchett, the world-renowned Moorefields Hospital, the English hospitality and the interesting points of the giant-city, gave to this congress a brilliancy of character, thus far unknown. This meeting further succeeded at its last session on the 3d of August in determining, according to the constitution, the date and locality of the fifth session, which actually took place accordingly.

Prepared by Agnew, Noyes, and Roosa, this congress met at New York, from September 12th to 14th 1876. Although its membership was large (104), but few, as was natural, of the European ophthalmologists had gone across the ocean.

This session thought the continuation of the congress insured by electing on motion of Dr. Noyes, a committee, consisting of Dr. Hansen, of Kopenhagen, Drs. Becker, of Heidelberg, and

Arlt, of Vienna, with full powers to select time and place of the next meeting, and to transfer these powers to a local committee after the place should have been decided upon.

In spite of the earnest efforts of this illegally elected committee, it could not succeed in executing its mandate. It could neither gain the consent of the interested parties for Kopenhagen, nor for one of the Swiss cities. The ophthalmological section of the universal medical congress, held in Geneva in September 1877, unanimously asked to have the next international congress of ophthalmologists called together at Vienna, in 1880. Arlt had already taken care to secure the liberal support of the Austrian government. But, the whole scheme fell to the ground, when some of the most prominent ophthalmologists of Vienna, refused to act in concert with the wishes of the committee.

The members of the committee, at that time, thought it best not yet to select a city within the new German empire. They were thus forced to announce through the press, that they refused further action in this matter, and transferred their powers into the hands of the ophthalmological section of the medical congress at Amsterdam.

This section accepted the mandate and resolved at a meeting, held September the third, 1879, that the sixth periodical international congress of ophthalmologists should meet in an Italian city, and, that its selection should be left to the Italian ophthalmological society.

It was due to Donders' efforts, who was the president at the Amsterdam meeting, that Italy succeeded in fulfilling this trust in a brilliant manner.

Quaglino, who was made chairman of the committee on preliminary work, called the sixth congress to Milan, and it began its meeting there in September 1880. There were 118 members present.

Before closing the session an invitation on the part of Cervera (Madrid) was enthusiastically accepted, and it was decided that the next session should be held at Madrid in 1884. A motion by Dr. Landolt, that in future the sessions of the periodical

international congress of ophthalmologists should be united with those of the section of ophthalmology of the international congress of the medical sciences, was laid over to be acted upon at the next session of the international congress.

This session never took place. The universal medical congress which was to meet at Kopenhagen in 1883, was postponed until 1884, and this fact induced the Spanish committee not to call the session of the international congress of ophthalmologists for the same year, and to leave it to the section of ophthalmology of the Kopenhagen congress to decide on the next meeting of the international congress of ophthalmologists.

The official report of the Kopenhagen congress does not show, whether this question was ever taken up by this section.

Since then nothing further has been heard from the periodical international congress of ophthalmologists.

Shall it quietly disappear from the list of scientific congresses?

The ophthalmological society of Heidelberg is not of such an opinion.

This society through us makes it known, that it is our desire to be able to shake hands with all colleagues of all countries at its 25th anniversary in the second week of August 1888 at Heidelberg, and we desire to draw attention to the fact that already once before the International Congress of Ophthalmologists was aroused from a death-like trance by this society and to remind them of the resolution of the Milan congress, that the next session shall decide upon Dr. Landolt's motion, as above mentioned.

If this motion should prevail the International Congress will, though losing its individuality, live on vigorously and honorably, in another form.

The ophthalmological society which we represent, hopes the more, that its invitation will be readily accepted by all, since the Periodical International Congress of Ophthalmologists has never before met in a German city.

Otto Becker.—Wilhelm Hess.

January 1888.

REVIEWS.

THE REFRACTION OF THE EYE. A manual for students. By Gustavus Hartridge, F.R.C.S. P. Blakiston, Son & Co., Philadelphia. Third edition. Price, $3.

This book which in a few years has reached its third edition gives a clear and full exposé of the errors of refraction and accomodation, with practical rules for their correction. It is characteristic of the English writer that ophthalmoscopy is detailed in 16 pages, while retinoscopy occupies just double that space. It has 96 illustrations, including 4 pictures of the fundus of myopic eyes. Altogether it is a very commendable little volume.

HANDBOOK FOR YOUNG AND OLD OPTICIANS. A concise and comprehensive treatise on the theory of the optical trade and of its mechanical manipulations. An indispensible companion to all progressive co-laborers of the optical trade, containing many points heretofore unexplored and unexplained. With illustrations. By W. Bohme, optician. Published by the author, No. 119 Canal street, New Orleans, La., 1888. Price, $2.50.

This title is almost pompous enough to frighten an ordinary reader away. However, with all its unnecessary display, it cannot materially alter the fact, that the little book is of value and will repay the reading.

It is a fact, which we note with satisfaction, that the intelligent opticians are beginning to be more than mere mechanics. This tendency should be decidedly encouraged. The more they know about the theory of the optical trade, the less will they be liable to do bad work and to practice quackery.

With all its faults, we heartily recommend this original effort of an optician, to opticians and oculists.

THE PRESCRIPTION, THERAPEUTICALLY, PHARMACEUTICALLY AND GRAMMATICALLY CONSIDERED. By Otto A. Wall, M.D., Ph.G., St. Louis, Mo. 1888. Aug. Gast Bank Note and Lithographing Company.

This is a scholarly book, worthy of a wide-spread circulation, and if our recommendation can do anything to help this circulation along, we feel that we have aided in a good cause. The necessity of such a book is obvious to anyone who will take the trouble to step into a drug store and look over a few pages of the prescriptions daily received there. Dr. Wall ought to have the thanks of the whole profession. The type is, however, too small and should be changed.

THE NURSE AND MOTHER. A manual for the guidance of monthly nurses and mothers, etc. By Walter Coles, M.D., St. Louis, Mo. 1887. J. H. Chambers & Co.

This is a very practical manual and full of valuable suggestions to those to whom it is addressed and who will be well instructed by its counsels. The doctor will allow us to draw his attention to the fact that we fail to find any mention of blenorrhœa neonatorum, its origin and prophylaxis, and *wrong* treatment. Some sound advice in this direction could, in our opinion, not fail to do a great deal of good in the hands of those who will read this book, and we feel satisfied that there will be many of them. ALT.

THE TREATMENT OF HÆMORRHOIDS BY INJECTIONS OF CARBOLIC ACID AND OTHER SUBSTANCES. By Silas T. Yount, M.D., of Lafayette, Ind.

This little work gives some very practical hints on the treatment of hæmorrhoids by injections. It contains illustrations including one of the author's speculum and several of his methods of injecting; also a description of some cases from the author's practice. The exact procedure of the operation and errors to be avoided are clearly laid down in the treatise. In short, it is a book which the reviewer can recommend to all interested in the subject. L. T. RIESMEYER.

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A CASE OF LEUKÆMIC RETINITIS.

BY G. E. DE SCHWEINITZ, M.D. (UNIV. OF PENNA.).

Ophthalmic Surgeon to the Philadelphia Hospital, Children's Hospital and to the Infirmary for Nervous Diseases.

Hirschberg (*Centralbl. f. prak. Augenheilk.*, April, 1887) describes a case of leukæmic retinitis in which the visual sensations were the first symptoms complained of and where the ophthalmoscope led to a diagnosis. Briefly, Hirschberg's case was as follows: The patient, a male aged 33, presented himself because there constantly appeared before his right eye, when looking upon white paper, a dark, balloon-like figure. A central hæmorrhage was found, and in addition numerous minute hæmorrhages studded the retina. A month later a precisely similar appearance was found in the left retina. The discs now became blurred, and the veins were surrounded by white margins, while white patches appeared in the retinæ. The spleen was enlarged and this enlargement was progressive and uninfluenced by treatment. The bones were tender. On examination of the blood the white corpuscles were found about equal in number to the red.

Inasmuch as leucocythæmic retinitis is a rare affection, the record of a case which has recently come under my notice

may prove interesting. This is the more true because as in Hirschberg's case the visual sensations were the first symptoms which caused the patient to come to the hospital for treatment.

Charles G———, aged 21, presented himself in the Eye Dispensary of the University Hospital, December, 1885. He was a school-teacher by occupation. For some time he had suffered with pain in and around the eyes, most marked upon the left side. Before the left eye there was constantly present a bluish spot, one inch in diameter, when he looked at white paper held ten inches before his eyes. The edges of this spot merged on either side into areas of indistinct vision. *O. D.* Vision $^{20}/_{1}$. Nerve margins indistinct, especially at the lower and outer border. Full, broad, tortuous veins; arteries pale, about normal in calibre. Along the course of many vessels yellowish patches and occasionally linear hæmorrhages, Overlying the upper temporal vein a blackish mass, the remains of a former hæmorrhage. Near the outer margin of the disc several striated hemorrhages. In the macular region numerous small, yellowish patches and fine, striated hæmorrhages. The macula surrounded a red-brown margin, within which were gathered numerous white dots and lines, more or less radially arranged around the fovea. *O. S.* Vision $^{20}/_{c}$. Nerve margins much more obscured and the discs distinctly swollen. Veins full, pale and tortuous and along the upper temporal vessels a large hæmorrhage. Retina more diffusely infiltrated with yellowish-white patches, the macular region occupied by a large brownish patch, having fringed edges, the seat of a former hæmorrhage.

Some questions elicited that he had had chills and fever, and for some time had suffered from what he supposed was "dumb ague," pain in the back, headache, nausea, etc. He was required to pass urine in the Dispensary, and this when tested showed distinct albumen reaction. Although the retinæ by no means exhibited the appearances found in a typical case of albuminuric retinitis, the presence of albumen in the urine and the lesions in the right macula led me to be-

lieve the case was one of kidney origin. Constitutional treatment was ordered, the man returned once or twice and then disappeared from observation for a little more than a year. After the lapse of this time he reappeared, and presented much more marked constitutional disturbances and an increase in the retinal changes. The broad, pale, tortuous retinal veins, the orange yellow choroid, numerous fresh hæmorrhages and the remains of old ones, the white and yellowish patches in the retinæ and the increased opacity and swelling of the discs presented a striking and characteristic ophthalmoscopic picture. The patient was referred to Prof. W. Osler for general treatment, who admitted him to the Medical Wards of the University Hospital and from whose subsequent examinations and records I am kindly permitted to quote.

In addition to the history already recorded it may be added that as a lad this patient was healthy. When twelve years of age he had a prolonged attack of intermittent fever. During 1885 he had the afternoon headache, nausea and malaise of which he spoke when he paid his first visit to the Eye Dispensary. After that, up to the time of his second visit, his chief general symptoms were giddiness, progressive weakness and for three months afternoon fever and heavy sweats. He had frequent attacks of epistaxis and bleeding from the gums. Deafness in both ears developed, and this has remained in the left ear. He has had occasional attacks of diarrhœa and gradual increase in the size of the abdomen. During the last three months before his admission he has felt better, but the nose bleeding continued. His father and all his family are bleeders. There were no cardiac murmurs: the sounds at apex and base were clear. At the base of the neck the sounds were somewhat ringing. The abdomen was greatly swollen and this swelling was most marked upon the left side, due to the presence of an enormously enlarged *spleen*, which existed as a solid mass reaching almost to the symphysis The *liver* dulness in the nipple line was from the upper border of the sixth rib to just below the costal arch. The *lymphatics* were nowhere enlarged and the bones were not increased in

size or tender. Numerous examinations of the *blood* were made. The blood drop was creamy in consistence and of a reddish-brown color. On the day of his admission the examination of the blood yielded the following result:

Red blood corpuscles, 2,470,000.

White blood corpuscles, 617,500.

White to red as 1 to 4.

Two weeks later there were 1 white to 3.62 red and the hæmoglobine was 32%. Ten days later there was 1 white to 2.58 red, and three weeks later the proportion was 1 white to 5.08 red and the hæmoglobine had risen to 40%. The temperature varied from the normal to a little over 100° F. The quantity of urine voided in twenty-four hours was from eleven to eighty-seven ounces and, as before stated, at the first examination contained albumen. There was distinct amelioration in some of the symptoms under treatment, but the patient left the hospital and is not now under observation.

The case[1] just detailed was one of splenic leucocythæmia, to which variety of this disease the retinal changes are almost exclusively confined. As is usual, the one eye was more affected than its fellow. Manifestly two points of interest present themselves for consideration. This patient, although knowing that his general health was below par, came for treatment because of subjective visual sensations, viz., a dark spot before the left eye, fully explained by the large, old, fringed macular hæmorrhage. At the first examination the true nature of the disease was not fully determined, because the retinitis, although not typical, was supposed, on account of the albuminous urine, to be uræmic in origin. Moreover, the right macula certainly exhibited changes similar in appearance to such as are found in primary renal disease, as well as those related to the blood state. This association has been noted and a case in illustration is figured by Poncet (Perrin and Poncet. "Atlas," p. 66, quoted by Gowers's Med. Ophthalmo-

[1] I have already referred to this case in a discussion on Leucocythæmia before the County Medical Society of Philadelphia. Proceedings of the County Medical Society of Philadelphia, Vol. VIII, p. 152, 1887.

scopy, 2d edition, p. 217). Organic kidney disease in this patient was, however, not necessarily a complication, as the presence of the albumen may easily be explained by a mechanical hyperæmia of the kidney due to the pressure exerted by the enormously enlarged spleen upon the renal veins.

AN OPERATION FOR PTERYGIUM.

BY C. M. HOBBY, M.D.,

Lecturer upon Ophthalmology and Otology in the Medical Department of Iowa State University.

The multitude of methods described in the books for the excision, transplantation and strangulation of pterygium indicates that no single method has met with universal approval; and in adding another, which presents some features that I believe have not been described, it is only after six years' trial and more than one hundred operations have convinced me of its value, that I do so. Whatever may be accepted as the course of pterygium, its axis of growth, as a rule, corresponds with one of the meridians of the globe, and it is most frequently developed in that portion of the globe which has been shown by Dr. Young (Am. Jour. of Oph., Vol. IV, p. 302) to be peculiarly exposed to external influences.

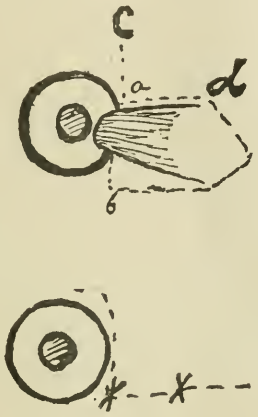
The tendency to recurrence has led to attempts to change the axis away from the cornea, so that additional growth may not further embarrass vision; and the frequency with which the cicatrix left after incision has apparently determined a new encroachment upon the cornea, has led many operators to abandon this operation.

The method to be described secures, first, the change of the axis of the cicatrix, so that instead of pointing to the pole of the cornea, it becomes tangent to the lower margins; and second, the whole cicatrix is removed from the exposed portion, and is covered by the lower lid.

The steps of the operation can be best understood by the diagrams. First, the conjunctiva is incised along the upper margin of the pterygium, as shown by the dotted line (Fig. 3,

a—*d*) and a vertical incision extended from the margin of the cornea, nearly at right angles (Fig. 3, *a*—*c*.)

Second, the pterygium is separated from the cornea and an incision downward made, a little lower than the lower margin of the cornea (Fig. 3, *b*).



FIGS. 3 AND 4.

Third, the incisions in the conjunctiva are extended to the base, joined, and the pterygium carefully dissected off.

Fourth, with a strabismus hook the conjunctiva is freely separated above, so as to secure co-aptation without strain.

Fifth, the upper flap of conjunctiva is brought down and secured by two stitches (Fig. 4).

Slight changes in the direction of the incisions will be suggested in very large pterygia, and the pterygium may be in part utilized to increase the upper conjunctival flap.

ON SYMPATHETIC DISEASES OF THE EYE, VIEWED FROM A MODERN STANDPOINT.[1]

BY ADOLF ALT, M. D.

Mr. Chairman.—Sympathetic affections of the eye, since first recognized in their true character, have continually engaged the research and observation of a large number of investigators and clinicians. For many decades the nature of these affections was hidden in absolute mystery, and the theories which tried to explain the phenomena were equally mysterious. The light of modern science having penetrated into many a dark nook of our knowledge, has no less failed to clear up some points in this interesting but hitherto dark subject. If we cannot as yet say, that it is all as clear as daylight, we can at least see the sun rise above the horizon. Perhaps, it is but proper for me to make here the usual excuse for intruding upon the time of this honored assembly with a subject such as I have chosen. If I have hoped that with this subject I might engage your attention, it was for the reason, that sympathetic eye-affections ought to be as well known to the general practitioner as to the specialist in their causes, development and dire results. The subject for some years does not seem to have been brought before you and with what modern science has added to our knowledge, I may, perhaps, be able to interest you a little. If, by doing so, I shall help in saving but one individual from the terrible result of sympathetic ophthalmia I will be well repaid.

What is a sympathetic affection of the eye? We call any affection of one eye due solely to a transmission to it of cer-

[1]Read before the Missouri State Medical Association at Kansas City, Mo., April, 18, 1888.

tain affections from the fellow eye, a sympathetic one. Thus, for instance, if a patient suffers from iritis due to a specific cause in one eye at first, and is later on attacked by the same disease in the fellow eye, we would not consider this second affection in common parlance a sympathetic one, simply because the affection of the second eye is due to the same systemic cause as is the one of the eye first diseascd. From this it will be seen that there exists often a grave difficulty in proving,that in certain eye-affections we really have to deal with a purely sympathetic disease. And this has often given rise to the very natural suspicion, that certain reported cases could not without doubt be admitted to have been purely sympathetic ones. In fact this doubt may be brought to bear on almost every such case, and it will be hard to refute it. Nevertheless, we know from thorough clinical observation, that there are certain eye-affections which are apt to be transmitted to the fellow-eye, and we know, further on, what forms of sympathetic affections are met with, and what is the unchangeable fate of an eye thus sympathetically affected.

What affections of the eye are most prone to lead to sympathetic affections of the fellow-eye? Clinically speaking, any eye suffering from long continued irritation is apt to cause sympathetic trouble in the fellow eye. Such a long continued irritation is in most cases due to a chronic inflammation with visible textural changes, in others it may be due to a long continued mechanical irritation. Among the class of eyes similarly affected, by far the larger number are eyes which have at some time undergone an accidental or a surgical injury. The percentage of cases which, having suffered from an idiopathic disease, cause sympathetic trouble in the fellow eye is extremely limited. In a general way we may say, that eyes which in some way or other have been perforated, thus allowing the entrance of air, are most prone to give rise to sympathetic affection, although there are exceptions. Among these again it has seemed *clinically* established, that the diseases of the uveal tract, and more especially of the ciliary body are in the lead. Clinicians were, therefore, especially afraid

of eyes with a chronic cyclitis and preeminently of eyes with cyclitis dolens.

To sum up, eyes that have undergone a perforating injury, in which a low grade inflammation follows the injury, or in which in consequence of the prolapse and incarceration of a part of the uveal tract (especially the iris and ciliary body), or the presence of a foreign body, or the formation of bone, etc., a continued irritation is kept up, are most apt to cause sympathetic affection. The rarer causes of sympathetic troubles are here omitted.

In what forms do the sympathetic affections appear?

Here we have to distinguish between sympathetic irritation and inflammation. In the former we have no textural changes in the sympateetically affected eye, in the latter grave changes take place.

The symptoms of sympathetic irritation are, loss of working capacity in consequence of hyperæsthesia of the retina, ciliary pains, photopsia, lachrymation. This is a condition which may exist for a prolonged period unchanged, and is usually the precursor of sympathetic inflammation.

The most frequent visible forms of sympathetic inflammation concern the uveal tract, although uncomplicated sympathetic neuro-retinitis is a well recognized, but rare, affection. In a few cases sympathetic keratitis has also been reported. Among the different forms of sympathetic inflammation which attack the uveal tract we have serous iritis, plastic iritis, plastic iridocyclitis, and iridochoroiditis. Sympathetic serous iritis seems to be a lighter form of sympathetic troubles in the uveal tract, and may, and does often get well. Sympathetic plastic iritis, however, although from the start looking like a common plastic iritis proves in the vast majority of cases to be of the severest type. Occlusion and exclusion of the pupil take place, in spite of treatment, with all their usual sequels of an increase of the tension in the posterior chambers of the eyeball (secondary glaucoma), and a slow but steady pushing forward of the periphery of the iris into the anterior chamber, thus giving rise to the condition which bears the classical, but rather incongruous name of

"crater-shaped" pupil. At this stage the disease has in most cases also led to further changes in the background of the eye which preclude the hope of ever being able to restore to that eye even a portion only of its function. Luckily, in some cases the disease comes to a standstill at an earlier period and a sufficient number of cases are on record to prove that by judicious careful treatment we may sometimes succeed in reducing the mischief done by sympathetic iritis to a considerable degree.

In other cases, and perhaps the majority, we have to deal with a sympathetic iridocyclitis and irido-cyclo-choroiditis which are always fatal to the eye thus attacked.

Sympathetic neuro-retinitis, if it remains uncomplicated, can, it seems from the experience of others as well as myself, get perfectly well and must therefore be considered one of the milder forms of sympathetic inflammation.

However, if left to themselves almost all the forms of sympathetic troubles will lead to total and irremediable destruction of the eye which they have attacked. There are some few exceptions to this rule. However, we have to add another which is less encouraging still, namely, that even with so to speak, timely interference, the vast majority of cases of a once established sympathetic inflammation are doomed to utter blindness, an incurable blindness, a blindness which might have been prevented—and this is the saddest as well as the most important point.

What do we know about the mode of transmission of the disease from one eye to the other?

We know that each optic nerve has a dura and a pia mater sheath and between them the intervaginal lymph space. We know that the latter communicates with the intra-cranial cavity on the one hand and with the interior of the eyeball on the other. The dura mater sheath merges in the dura mater proper at the optic foramen, while the pia mater sheath accompanies the nerve to the chiasma, and joins the pia mater of the brain. Both optic nerves as well as their respective pia mater sheaths, meeting in the chiaams, what could lie nearer

than to accept this channel as the simplest and most natural for transmission of the disease? Why seek after mysterious ways and build up theories unproven? Yet, although even the oldest writers on the subject, especillay Mackenzie, had this solution of the question in mind, their ideas were changed by their followers, and, as yet, a number of investigators will have us believe in some mysterious agencies in the production of sympathetic eye affections, although during the last decade abundant proof has been brought forward to strengthen the belief of a great many, that the simplest and shortest way is undoubtedly the one by which the transmission of the disease takes place. It would lead me too far for your indulgence would I attempt to let all the different theories of the transmission of the inflammation in sympathetic eye troubles pass in review before you. Yet, let me mention shortly, that in consequence of a wrongly interpreted remark of Heinrich Müller, not even properly substantiated by him, the idea was promulgated that the ciliary nerves are the real channels by which the transmission takes place. Sufficient practical proof not being offered for such a strange dictum, it had to be supported by all sorts of theories in which certain facts were given an importance far beyond their real value. For instance, Critchett pointed out, that in his experience very frequently when the first affected eye suffered from cyclitis dolens, a painful spot might be found in the ciliary region of the sympathetically affected eye exactly symmetrical to the most painful point in the first affected eye. Although I have personally never had occasion to see this, I do not doubt the fact. Yet, let me ask, can we consider this undoubtedly accidental occurrence a proof of the theory that the disease had travelled from one eye by way of a ciliary nerve into the ciliary ganglion, and to the brain, and medulla oblongata, and then back by way of a symmetrically situated ciliary nerve to the ciliary body of the sympathized eye? It seems to me that this was going a little too far.

Reflex paralysis of motor nerves being proven, a number of authors thought to best explain the occurrence of sympathetic

affections by some sort of a reflex action, perhaps reflex paralysis of sensitive nervs and most recently Theobald has been breaking several lances for this theory.

It seems to me, that reflex-action is to be considered the main factor in what is called sympathetic irritation; but as soon as we have to deal with sympathetic inflammation, this can not and, as yet, has never been satisfactorily explained by reflex-action. Aside from the fact, that the simplest explanation of the natural phenomena observed by us, is most likely to come nearest to the truth, we have ample proof, for those that are willing to believe it, that a direct transmission of the inflammation can take place from one eye to the other by way of the optic nerve and its pia mater sheath and, according to the more recent experiments of Gifford, perhaps, also, by way of certain lymph-channels, (so far demonstrated in animals only) which are said to leave the optic nerve with the central blood-vessels and to pass through the orbital tissues into the intracranial cavity. The direct transmissibility of morbid agencies from one eye to the other by way of the optic nerve and its pia mater sheath, I consider proven by the experiments of Leber, Deutschmann, and myself. There is, however, one point, yet, which is not settled, namely, whether we have to consider sympathetic ophthalmia, as Leber and Deutschman will have it, as a microbian affection due to a certain germ, or not. It is true, Leber has proven, that aseptic foreign bodies brought into an eye under antiseptic precautions may remain therein indefinitely without giving rise to any inflammatory symptoms. Deutschman has even succeeded in culturing a streptococcus taken from sympathetically affected eyes and experimentally produced sympathetic affections–yet, others have not been able to verify this point. Suffice it to say, that it is my opinion, that we know that the materia peccans, whatever it be, is directly transmitted from one eye to the other by way of the optic nerve and its pia mater sheath, or by, perhaps also, the lymph streams described by Gifford, which were just mentioned, and that it is at this date, no longer possible to adhere to all the mysterious theoretical explanations

built up with such an immense amount of brain work. The pathological facts are becoming too powerful, in my opinion, to allow of any other explanation.

What means are at our disposal to combat with so dreadful an affection?

If the old adage that a pound of prevention is worth any quantity of cure holds good anywhere, it surely does so in sympathetic eye-affections. To prevent the disease must be our rule, since in trying to cure it we will in most cases fail most certainly.

In the light of modern science such prophylactic measures have greatly increased in numbers. Antiseptic applications have rendered the results of the primary injuries less to be dreaded. With the aid of the magnet or other appliances foreign bodies may, with greater safety, be removed from the injured eye. By these means certainly a large number of cases which in former days would have produced sympathetic affections are rendered considerably less harmful, even though the primarily affected eye lose its function.

When, however, the injury is such that there is no chance of our controlling its effects, or when the patient is not so situated that he can remain under careful supervision in order to find out the first possible signs of sympathetic trouble, or as soon as such trouble is making its first appearance, the chief prophylactic remedy is the removal of the injured eye with as much of the optic nerve as can safely be removed. It is easy to understand why the removal of such an eye, before a transmission of the disease has taken place, should be a sure prophylactic means with regard to the fellow eye. Why it should be still useful in the beginning of sympathetic trouble and even in some cases of sympathetic iritis, is not as easily explained, and, in fact, has never been explained. Yet, the fact is well established by experience and cannot be denied. On the other hand, some well authenticated cases have been reported in which the first affected eye, after having caused the total destruction of the fellow eye by sympathetic inflammation, could later on by an operation be rendered

a comparatively useful eye. These cases must teach us to discriminate, yet, they cannot be advanced against the prophylactic enucleation of the injured eye, because it is surely more valuable to save the patient one perfectly good eye, than to jeopardize its existence as an organ of vision in the hope of being able to render the injured eye a comparatively useful one after the fellow might have been destroyed by sympathetic inflammation. There was a time when eyes were indiscriminately removed, but this period has passed, and it is no longer necessary to preach against it. What eyes to enucleate, and, when to enucleate, are questions much better understood now-a-days than formerly.

For different reasons substitutes have been recommended for enucleation. The theory of transmission by the ciliary nerves, the overrated danger of death from meningitis after enucleation, the disfiguration, the poor motility of an artificial eye were the leading points in these more recent surgical procedures.

In order to do away with the possibility of transmission by the ciliary nerves, cutting of these nerves was proposed and developed finally into the operations of optico-ciliary neurotomy and neurectomy. They have had their day, and flourished for a while, and have been found wanting. These operations preserved the eyeball, they did, perhaps, some good unintentionally, since the optic nerve was severed; yet, they did not prevent sympathetic trouble after all; because the tissues including the nerves grew together again, or because, the materia peccans being left in the orbit, its transmission to the fellow eye by the channels described by Gifford was not materially interfered with.

More recently evisceration of the eyeball was introduced as a preventative of meningitis and with the idea of leaving in the shape of the sclerotic a better stump for an artifictal eye to rest on. In this operation the contents of the eyeball are scraped out. Mules has even gone so far as to insert an artificial vitreous made of glass or silver and heal it in, so as to have an excellent support for the artificial eye. Aside from

the fact, that the healing after this operation is very tedious and painful, I think the theoretic objection, that it does not do away with the danger whenever the materia peccans has already got into the lymph channels passing through the sclerotic is sufficient to condemn the procedure—and it has surely not gained much favor with the profession.

What is to be done when an eye has been attacked with sympathetic inflammation?

In the first place, as already stated, enucleation of the injured eye is of curative value in sympathetic irritation, and in some cases of sympathetic iritis.

But even when no good can be expected any longer from the enucleation of the injured eye, no man who sees the poor patient going blind before his eyes will give up in despair, and it has been the good fortune of a number of gentlemen and also of myself by persistent and, so to say, heroic mercurialization, combined with local applications, to save once in a while an eye which appeared to be doomed without doubt. Such cases are not frequent, yet, the result, even if only a partial one, is an ample reward for the patience and care such cases will demand.

In cases of sympathetic iritis with secondary glaucoma, the inexperienced is tempted to perform an iridectomy, but this is useless and dangerous, and precludes the possibility of surgical help at a future time, as all such attempts have only the result of having removed a certain portion of iris-tissue and having rekindled the inflammation, while the newly-made pupil promptly closes up again.

The rule is absolutely—hands off!

Later on, after years of patient waiting, when all symptoms of inflammation and irritation have totally disappeared and the eye is at rest, when light perception and projection are good, an iridectomy and sometimes the extraction of a cataract found at this operation, may still be able to give some and sometimes quite useful sight.

TRANSLATION.

THE VISIBLE CIRCULATION IN NEW FORMED CORNEAL BLOOD VESSELS.

BY DR. FRIEDENWALD, OF BALTIMORE.

From Prof. Hirschberg's Centralblatt f. Prakt. Augenheilkunde.

In experiments with Hartnack's spherical magnifying glass[1] (Kugellupe) which has been used at our clinic to great advantage, principally in the examination of the anterior portions of the eye, I[2] had occasion to observe a circulatory phenomenon in the cornea, which owing to its peculiarity, deserves a careful description. I have in vain searched the literature for the report of a similar observation, and had occasion to see with what surprise the numerous guests who come to our clinic, testified to the originality of my observations. The first time I made this observation, was in a case of vascular keratitis. In trying to study the form and arrangement of the blood vessels more closely, I was surprised that I was able to see a distinct blood stream in some of these vessels. The flow was neither uniform nor uninterrupted, but the contents of these small vessels were divided into small particles, and these particles moved now by jerks, now in a steady course. The picture may be best compared to an exceedingly fine rosary with some beads here and there lacking. The

[1] The lens is aplanatic and achromatic, and according to the manufacturer's statement, gives a magnifying power of from 20 to 22 times at a distance of 250 mm.

[2] Cf. Hirschberg, Ophthalmoscopy in Eulenburg's Cyclopædia. 1st Edition, 1882; Vol. X, p. 134.

red columns are separated from one another by colorless intervals.

The latter attain the greatest length in the narrowest vessels. The red columns also vary in length; sometimes they are so small that they are hardly visible, and again they appear to fill the lumen of the vessel perfectly and are often much longer than broad. It could be plainly seen how this chain of red and white columns moved with great velocity in the broader vessels, and much slower in the smaller ones which resembled capillaries. In the majority of cases I undoubtedly had to deal with venous blood vessels for the direction of the current was toward the periphery of the cornea from the smaller to the larger branches. Where this could not be positively proven, the vessels, owing to their fineness and numerous anastomoses, bore the character of capillaries. It remains, therefore, still doubtful if the arterial vessels show the same phenomenon.

The same observation which I made in the case of keratitis vasculosa just mentioned, I was soon able to repeat in a variety of corneal affections. It could not only be observed in cases of recent, retrograding, or healed keratitis superficialis, but also in interstitial keratitis, whether recent or old, pannus trachomatosus, pannus e trichiasi. This shows that the phenomenon is not characteristic of any one single form. However, it was much easier seen in some cases than others. Even in the smallest superficial blood vessels of the conjunctiva bulbi,[1] the same phenomenon could be observed. I am at a loss to find an explanation of this phenomenon, yet I wish to state, that the circulation as seen under the microscope

[1] I find the following observation in Prof. Landois' text book on physiology, page 182: "With good illumination and with low magnifying powers we may observe the blood vessels of the frog's liver (Gruithuisen 1812), of the pia mater of the rabbit (Donders), of the frog's (swimming) membrane, and of the mucous membrane of the inside of the lids in man (Hueter), and further also of the *conjunctiva palpebrarum et bulbi*."

A communication from the author tells me, that his observations with regard to these latter blood vessels have not yet been published.

in the membrane of the frog's foot is not the same. Most certainly these small red columns can not be mistaken for single blood corpuscles; moreover, a drop of blood viewed with this lens (Kugellupe) gave a totally different picture, in which the single points were not by far as plain as in the case above reported. I am not ready to decide what these columns and colorless interspaces contain. I hope that further examinations, to which these lines are meant to give the stimulus, will lead to the solution of this question.

For this reason I wish again to emphasize, that great perseverance and attention, a good Hartnack's lens[1] and clear focal illumination are necessary to study this peculiar circulation, and, that even with these it is uncommonly difficult. In this respect I further wish to state that the examination of the smallest blood vessels is the easiest and promises the best success.

I was not spared the experience, that even proficient observers were inclined to deny the existence of this phenomenon after their first attempts to see it, and that after repeated and attentive observation they were surprised by the clearness with which it was to be seen.

[1]The lens is preferable to the corneal microscope on account of the ease with which it may be handled.

CORRESPONDENCE.

EXCESSIVE HÆMORRHAGE AFTER CATARACT EXTRACTION.

Kansas City, Mo., April, 1888.

Editor American Journal of Ophthalmology.—I was very glad to read the admirable paper which Dr. Hotz published in the last number of the American Journal of Ophthalmology, on excessive hæmorrhage after cataract extraction. The whole subject is one of great interest and I trust that other operators who, like Dr Hotz and myself, have met with this catastrophe, will publish their experience also.

I agree with Dr. Hotz, however, that such excessive hæmorrhage after removal of cataract must be extremely rare.

I would wish to state in reference to Dr. Hotz's paper where he says that I do not mention the escape of vitreous during the hæmorrhage, that no vitreous, as far as I know in my case, appeared either during or after the hæmorrhage or at any time. I did not see the case for some hours after the blood-flow began, but a very inteligent nurse, one of long experience in nursing eye cases in general and cataract cases in particular was in charge, and took off the dressings at once on the bleeding beginning and looked for vitreous, but is positive none appeared.

Moreover, when I did see the patient later and cleansed the clots from the lips of the incision and coaxed out some of the blood from the anterior chamber, no vitreous came. Nor had the eye the shape or tension of one the vitreous of which was gone in whole or part.

B. E. Fryer, M. D.

ZANESVILLE, OHIO.

EDITOR AMERICAN JOURNAL OF OPHTHALMOLOGY. — The cases of Drs. Fryer, Hotz and Mooren referred to in the March number of the AMERICAN JOURNAL OF OPHTHALMOLOGY, recalled a similar example in my own practice the notes of which are as follows:

A. G., aged 73 years. As usual before operating I examined the case, and found that he could see a light in all parts of the visual field, and I recognized no contra-indications to the operation of extraction of his cataract in the left eye. I operated October 2, 1883, assisted by Dr. C. C. Hildreth, under cocaine and duboisine. No anæsthetics were given. The patient sat during the operation. His cataracts were nuclear and hard, and had existed for several years.

Galezowski's operation was performed successfully. The puncture and counter-puncture, 2 mm. above the horizontal meridian of the cornea and at the corneo-scleral junction. The incision was brought out 2mm. in front of the upper margin of the cornea. The fixation forceps and speculum were removed after the incision was made, and he was enjoined not to compress the eyelids, but notwithstanding this injunction he did this, no doubt also contracting the recti, and forced out the cataract quite suddenly. However, no vitreous appeared, and the iris was not enclosed in the corneal wound, but was in its normal position. I divided the anterior capsule crucially with the point of a narrow ($^1/_2$ mm.)Græfe knife before making the counter-puncture,and in cutting the flap after the counter-puncture, the iris, in its upper segment, was slightly cut before the incision was completed. I did not consider that this accident demanded an iridectomy. After the cataract had been expelled there was only very little blood in the anterior chamber from the very small incision of the iris. The corneal wound was adapted nicely. He saw the light very plainly through the blood after the operation. The eye was dressed with cotton and both eyes were bandaged.

October 3. During the night, at 1 A. M., he was suddenly taken with great pain in the eye, for which he was given hy-

drate of chloral ℥ij, croton chloral ♏ij, morph. sulph. gr. iij, Syr. simplex. f. ℥ij, S. Teaspoonful every hour until easy or sleepy. He took three doses and had no severe pain afterwards. On visiting him in the morning I found the bandages saturated with blood, and the vitreous extruded and covered with blood. I removed the clots covering the extruded vitreous and the vitreous. The iris did not protrude nor was it bleeding. I put on a compress bandage and applied ice water cloths over the eye. Panophthalmitis followed and the eyeball became atrophied. The operation was painful, although the cocaine was reliable. I have noticed this pain in other eye operations in old persons, and have attributed it to some defect in the blood-vessels due to age.

The source of the hæmorrhage in this case, I thought was from the ruptured blood-vessels of the choroid, and this lesion possibly due to spasm of the recti. The choroidal vessels may have been diseased, and this may have been the predisposing cause of the rupture. H. Culbertson.

Editor American Journal of Ophthalmology—Sir, Charged by the Committee of the Ophthalmological Society of Heidelberg, which is commissioned with the preparation of the International Ophthalmological Congress, to be held at Heidelberg from the 9th to the 12th of August, 1888, we apply to you with the request that you will peruse the inclosed programme and favor the meeting with your kind support.

In inviting our foreign colleagues to the International Congress, we have two objects in view, viz., first to celebrate in a solemn manner the 25th anniversary of our, the oldest Ophthalmological Society, and, at the same time, to connect our celebration with the preceding six Lustres of the International Ophthalmological Congress.

This Congress has labored of late under great difficulties, and shows serious symptoms of decay. By convoking it for the time when we celebrate the anniversary of the foundation of our Society, we meet the wishes of a great number of col-

leagues, all of whom would with us deeply regret, if the International Congress, after its previous successful labors, should come to an inglorious end.

We hope that, by accepting Landolt's motion, the Congress will be animated with a fresh, vigorous life. But, in order to arrive at this desirable end, it is highly necessary to secure the active interest of our colleagues at home and abroad, and among the latter your kind cooperation.

We inclose a preliminary *i. e.*, provisional programme of the forthcoming Congress with the request that you will procure it the greatest possible circulation among your colleagues.

We shall consider it a very great favor if you will kindly tell us that you accept our invitation.

The final programme will be forwarded towards the end of May. Notices of lectures or papers we beg you to address to one of the undersigned.

Otto Becker,
Heidelberg.
W. Hess,
Mainz.
J. Stilling,
Strassburg i. E.

Heidelberg, March, 1888.

PROVISIONAL PROGRAMM

OF THE SEVENTH

PERIODICAL INTERNATIONAL OPHTHALMOLOGICAL CONGRESS.

To be held at Heidelberg, August 9 to 12, 1888

On the opening day, August 8, until 9 o'clock a. m. inscription of members and visitors.

Thursday, August 9.

1. Meeting at 9 a. m.
 Reception of members and visitors by a member of Committee.
 Election of President, Secretary and other officers.
 Report on "Glaucoma." Reporter: Mr. Priestley Smith (Birmingham).
 Second Reporter: Mr. Snellen (Utrecht).
 Discussion.
2. Meeting at 3 p. m.
 Lectures and Papers, of which previous notice has been given.

Friday, August 10.

3. Meeting at 9 a. m.
 Report on "Cataract." Reporter: Mr. Gayet (Lyon).
 Second Reporter: Mr. Schweigger (Berlin).
 Discussion.
 Lectures and Papers, of which notice has been given.
4. Meeting at 3 p. m.
 Lectures and Papers, after previous notice.

Saturday, August 11.

5. Meeting at 9 a. m.
 Report on "Bacteriology." Reporter: Mr. Leber (Göttingen).
 Second Reporter: Mr. Sattler (Prag)
 Lectures and Papers, after previous notice.
6. Meeting at 3 p. m.
 Lectures and Papers after previous notice.
 In the evening at 6 o'clock congressional supper in the Old Castle.

Sunday, August 12.

Particular morning arrangements reserved.

During the afternoon Fête Champêtre in Ziegelhausen, in the valley of the Neckar, arranged for the Congress by the City of Heidelberg, with boat excursion on the Neckar. After sunset illumination of the Old Castle.

Notice: The general meetings of the congress are expected to take place in the Aula of the University. For demonstrations and experiments special rooms will be reserved.

THE PROVISIONAL COMMITTEE.

EDITORIAL NOTICE.

MEETING OF THE AMERICAN MEDICAL ASSOCIATION—HELD AT CINCINNATI, MAY 8, 9, 10, AND 11, 1888.

Section of Ophthalmology, Otology and Laryngology.

Chairman—F. C. Hotz, Chicago, Ill.

Secretary—Edward Jackson, Philadelphia.

First Day.

Address by the Chairman, F. C. Hotz.

"Melanotic Diseases of the Conjunctiva and Episcleral Tissue, with Five Illustrations," by Rob. Sattler, of Cincinnati.

"Ocular Troubles Influenced by Nasal Diseases," by L. H. Taylor, of Wilkesbarre, Pa.

"Binocular Astigmatism," by H. Culbertson, of Zanesville, Ohio.

"The $^1/_4$ Dioptric Cylinder Lens the Most Useful of the List of Cylinders," by J. J. Chisolm, of Baltimore.

"The Treatment of Strabismus due to Paralysis or Extreme Over-correction with Loss of Motion," by A. E. Prince, Jacksonville, Ill.

"The Size and Illumination of Test-type," by E. Jackson, Philadelphia.

Second Day.

"Some Practical Suggestions Regarding Certain Anomalies of the Ocular Muscles, by George T. Stevens, of New York.

"Gummata of the Ciliary Region," by S. C. Ayres, of Cincinnati.

"On Nutrition, or the Constitutional Treatment of Diseases of the Ear," by Laurence Turnbull, of Philadelphia.

"Some Remarks on Diseases of the Labyrinth," by Francis Dowling, of Cincinnati.

"The Bougie in Catarrhal Inflammations of the Middle Ear," by W. Cheatham, of Louisville.

Third Day.

"Reflex Nasal Cough, with Report of Cases," by Max Thorner, of Cincinnati.

"Reflex Phenomena in Childhood Caused by Rhinitis," by J. A. Stucky, of Lexington.

"Naso-Pharyngeal Fibromata," by E. F. Ingals, of Chicago.

"An Interesting Case of Fibroma of the Larynx," by Jos. Eichberg, of Cincinnati.

"Tubercular Laryngitis," by W. E. Welsh, of Grand Rapids, Mich.

"Illustrative Points in the Examination of the Nose and Throat," by Carl von Klein, of Dayton, O.

Fourth Day.

"Tobacco Amblyopia," by A. R. Baker, of Cleveland, O.

"The Advantages of Leaving One Eye Open During the After-treatment of Cataract Cases," by J. J. Chisolm, of Baltimore.

"Staphyloma of the Region of the Macula," by E. Jackson, of Philadelphia.

"A Plea for the Better Recognition of the Oculist in the Service of the U. S. Pension Department," by J. W. Wright, of Columbus.

Exhibition of instruments and apparatus.

OBITUARY.

CORNELIUS REA AGNEW, M. D.

Cornelius Rea Agnew M. D., died on Wednesday, April 18, in the fifty-eigth year of his age, after an illness of only a few days' duration—a peritonitis, understood to have originated as a typhlitis.

The deceased was a native of New York, and a graduate of the College of Physicians and Surgeons, of the class of 1852.

For a few years he was a general practitioner, but the greater part of his professional life was spent in the practice of ophthalmology and otology in which department he was one of the first, in New York, to arrive at eminence. At various times he occupied numerous positions of distinction in hospitals and medical societies. He was for many years the clinical professor of ophthalmology in the College of Physicians and Surgeons, and he may almost be said to have created the Manhattan Eye and Ear Hospital. But, excellent as he was in all these capacities, it was not by his strictly professional work that he was known so much as by the devotion and intelligence with which he taught his fellows the duties of citizenship. Although the extent of his services in this direction was known to only a few, enough of them was known to secure his general recognition in New York as one of the most respected of her citizens.

Perhaps the most far-reaching work of his life was what he accomplished as one of the organizers and working members of the United States Sanitary Commission. The commission was materially aided in its operations by his industrious labor, and guided by his wisdom. It is no more than the simple truth to say that every sick man and every wounded man in the Union Army had his condition alleviated, so far as mitigation of the horrors of war was possible, by appliances that were largely due to Dr. Agnew's forethought and executive skill. In another sphere, as one of the trustees of Columbia College, his efforts to improve the institution were constant,

and it is not to be doubted that they had much to do with bringing about the very decided advances made by the college during the last few years; and in a like capacity on the board of the College of Physicians and Surgeons he worked intelligently and zealously for the advancement of medical education in New York. In his devotion to the public interest he did not disdain to concern himself with political discussions and contests—never as a partizan or with any motive looking to his own advantage, but always as a source of light to those who were right at heart but perplexed in mind. In whatever sphere he acted, he always influenced men's minds powerfully, but, although he was a speaker delightful to listen to, he never resorted to oratorical devices, and seldom even to parliamentary tactics; it was rather his clear, cold logic, his evident fairness, and his unquestioned devotion to the general welfare that gave him his power in debate. Consequently, he never worked his hearers up to the point of voting under the influence of passion, and they never regretted having heeded his words. It long ago came to be understood in New York that Dr. Agnew's advocacy of any movement was *prima facie* evidence that the movement was a good one. To be sure, not every cause that he supported triumphed—occasionally intrigue, and on one memorable occasion mediævalism, proved too much for him—but never did an opponent indulge in innuendo against Agnew without writing himself an ass. He was a man whose course it was never necessary to explain; he was *sans peur et sans reproche*.

Personally, Dr. Agnew was a man of wholesome and attractive appearance. His glance was clear and penetrating, but kindly. He played the Mentor to many a misguided spirit, but his advice was given only when it was invited, and it always savored more of affection than of rebuke. With the community, with his professional brethren, with his patients, with his personal friends, and in his family, he was a remarkably exemplary man. His loss is that not only of the New York profession of medicine, but that of the entire people.—*N. Y. Med. Jour.*

THE AMERICAN JOURNAL OF

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VOL. V. MAY, 1888. No. 5.

BINOCULAR ASTIGMATISM.[1]

BY H. CULBERTSON, M. D., ZANESVILLE, OHIO.

Asistant Surgeon, U. S. Army. (Retired.)

I have not infrequently encountered cases of astigmatism, in which, after having corrected the error in each eye separately, and on testing both eyes simultaneously in binocular vision, have found that vision proximum was not perfect, and in order to attain normal vision near at hand in binocular sight the angle denoting the axis of the cylindrical glass must be changed in one or both eyes.

In correcting this binocular defect types and the astigmatic bars were employed. If the patient looks upon the floor, it will seem to incline to the right or left, and on changing the axis of one or both cylinders, the surface will appear level. But the same defect will be apparent if a board 12×3 inches, with parallel sides, be held in front of the patient at one metre, and on a level with the eyes. In these cases, then, the answer will be, that the right or left end of said *object-board* is wider than the other. The angle of one or both cylinders is changed

[1]Read before the Ophthalmological Section of the A. M. A.

until each end of the object-board seems equally wide, or in other words, the sides are parallel, and then it will be found that the astigmatic bars and the types are seen normally in near and far vision in binocular vision. All of my refraction cases are estimated not only by the usual methods, but the test as given is applied to all cases of astigmatism before the investigation is regarded as complete. The use of glasses thus adapted, has been successful in practice with but one or two exceptions, and in these the use of cylinders had to be dispensed with and spherical glasses employed.

This defect in binocular vision does not occur, of course in all cases of astigmatism; but observation has taught me that such errors are far from being uncommon.

The following explanation offered of binocular astigmatism seems more rational than any other with which I am familiar.

If a perpendicular be raised anteriorly, and horizontally midway between the eyes, from a base line intersecting each *fovea centralis*; then in testing each astigmatic eye separately, the AXIS OF VISION, will, in remote vision, be parallel to said perpendicular. If the ocular muscles are normally balanced in action, the plane which cuts the visual axis in the cornea will be vertical. In a normal eye, *its fellow being covered*, during near vision *still* the visual axis may be parallel to our perpendicular, and hence the angle of the axis of the cylindrical glass may often be the same in remote and near vision *when each eye is tested singly.* In binocular vision when astigmatism is present, the distance is so great in remote vision, that the visual axes are each parallel to our perpendicular and to each other, and when the ocular muscles are harmonious in action, objects, as types and astigmatic bars, are seen in normal form. So will vision be perfect near at hand, in astigmatism, provided this due balance is maintained in these muscles; but it is evident, that in proximal vision the interni, inferior obliqui, and superior and inferior recti muscles, must exercise increased force and act in concert. If these muscles do this, there can be no binocular astigmatism (in the sense cited) which requires recorrection after each eye has been separately corrected.

and in *vision near at hand.* But if these muscles are not harmonious, then the plane of the rays of light remaining the same, *that is vertical*, and the *axis* of *rotation* of the eye at its upper extremity inclining to the right or left, then it follows, that the relation of the axis of the cylinder and the astigmatic meridian of the cornea has been changed, and in order to restore this relation the axis of the cylinder must be made to correspond with the modified position of the defective corneal meridian.

Let the following case illustrate. In binocular and proximal vision: Suppose the left inferior oblique fails to act sufficiently to maintain the axis of rotation vertical, and that the inner fibres of the left superior rectus incline said axis at its upper extremity towards the nose; then the rays of light will no longer cut the cornea in its vertical meridian, but towards the temporal side of the should be vertical plane of the cornea. If the defective axis of the cylinder was at an angle of 180° in remote vision, for proximal vision, the axis of the glass will have to be turned upwards towards the displaced axis of rotation of the eye-ball, as many degrees as this axis has deviated from the normal vertical perpendicular. If to 10°, then the angle would be 10° instead of 180° for the cylinder, the scale running from the temporal side. In other words, the measure of the deviation of the axis of rotation is the number of degrees of axis-displacement of the cylinder, required in order to cause both sides of our object-board to appear parallel.

By trial the proper degree is found and in which eye the correction should be made, or if both eyes should be corrected.

In remote vision, the ocular muscles may, or may not be harmonious, but if these are normally balanced in action when accommodation is at rest, it is not difficult to comprehend, when the muscles supplied by the filaments of the third nerve are active, as in proximate vision, that, this relation may be modified, and the *axis of rotation* so changed as to demand a re-correction for near and binocular vision. This change of cylinders does not interfere with normal remote vision.

As these changes in the axis of the cylinders are observed in remote vision when the eyes are under the full influence of mydriatics, it results that the modifications in the axis of rotation, cannot be due, at least directly, to accommodation. This may be illustrated by the following case: Miss S. L. æt. 28 years. When under duboisia, she requires in the R. E. —1.0 sph. ⌒ — 0.5 cyl. ax. 130° and in L. E. — 0.75 sph. ⌒ — 0.5 cyl. ax. 40°. V 2 = $^4/_4$ and the astigmatic bars appear normal. But in binocular vision when the object-board is placed at one metre, the left end of said board seems wider, when the left cylinder is turned to 30°, the sides of the object board are seen parallel and the floor is level. When the effects of the mydriatic had passed off, a week later, the cylinders at 30° and 130° induced seeming parallelism of the object board and a level floor.

A few cases will be given illustrating the change of axis of cylindrical glasses, in order to obtain normal and proximal binocular vision.

Miss A. V. C, æt. 18 years. Under duboisine she requires in R. E. — 0.5 cyl. ax. 90.° V = $^4/_4$; and in L. E. — 1.25 cyl. ax. 45° V = $^4/_4$. At one metre the object-board is narrower at the left end, and floor inclines to her left in binocular vision, on turning the left cylinder to 60° the floor appears level, and the sides of the board parallel, and the distance types and astigmatic bars are now seen normal.

Miss M. C. æt. 27 years. Without mydriatic her case reveals that she requires in R. E. + 4.5 ⌒ + 1.25 cyl. ax. 105° V = $^4/_{24}$ and $^3/_{.29}$ D, and in L. E. + 2.5 ⌒ + 1.5 cyl. ax. 120°, V = $^4/_{24}$ and $^{1.5}/_{.29}$ D. V_2 = $^4/_{12}$ and $^{1.5}/_{.29}$D. The object-board sides are not parallel in binocular vision at 1 metre, or the floor level, until the left cylinder-axis stands at 120°, which later does not correspond with to the axis of the right eye, or 75°.

Miss A. H. B., æt. 31 years. Without mydriatic requires in R. E, + 0.5 ⌒ + .25 cyl. ax. 60°, V = $^4/_4$ and $^{.6}/_{.30}$ D; and in L. E. +0.5⌒+0.25 cyl. ax. 100° V = $^4/_4$. V_2 = $^4/_4$, and $^{.6}/_{.30}$ But binocular vision is not normal at one metre, unless the axis

of the right cylinder is at 60°. in line of 80°, which latter would correspond with the axis of 100° in the left eye.

Miss J. R., æt. 31 years. Under duboisine, she requires in R. E. + 0.75 cyl. ax. 50°, V = $^4/_4$; and in L. E. +0.75 cyl. ax. 140°, V = $^4/_4$, V_2 = $^4/_4$. But binocular vision at one metre is not normal when the axis is at 130°, left eye. A week later when the effects of the mydriatic had passed off binocular vision was perfect with the angles 140° and 50° in far and near vision.

Mr. J. G. S., æt. 18 years. Under duboisine he requires in R. E. + 0.75 cyl. ax. 40°. V = $^4/_4$, and in L. E. + 0.75 cyl. ax. 90°, V = $^4/_4$, V_2 = $^4/_4$. After the effect of the mydriatic had passed off, the axis of the right cylinder had to be turned to 90° in order to obviate binocular astigmatism at one metre, and then remote vision was perfect.

Mr. J. N. S., æt. 34 years, requires +2.75 cyl. ax75° V. R. E. = $^4/_9$, and + 3.5 cyl. ax. 90°. V. L. E. = $^4/_9$, V_2 = $^4/_9$, and $^{\cdot 6}/_{.30}$. But the object-board was not seen parallel at one metre. On turning the left cylinder axis to 105° binocular vision near and far became normal so far as glasses could accomplish, and these continued to serve him well.

Mr. F. G., æt. 27 years. Under duboisine requires R. E. + 1.25 cyl. ax. 180°, V = $^4/_4$, and in L. E. + 0.5 cyl. ax. 180°, V = $^4/_4$. But V_2 while = $^4/_4$ reveals the sides of the object-board not parallel. On turning the axis of the right cylinder to 30° the object-board is seen normally, and V_2 = $^4/_4$ and $^{\cdot 6}/_{.30}$ D.

Mr. L. I., æt. 19 years. Without duboisine the angle for each eye was 90°, but when under this mydriatic he required in R. E. + 3.5 cyl. ax. 70°, V = $^4/_{24}$, and the same cylinder in L. E. at 100°, V = $^4/_{24}$. The bars and types were seen normally. V_2 = $^4/_{24}$ and $^{\cdot 8}/_{.28}$. These glasses were given, and failed to give proper vision. He was given + 3.5 cyl. ax. 90° for each eye, and binocular far and near vision became normal. He was not brought under mydriatic at the second application. It is certain that this patient under the mydriatic saw in binocular vision normally. But after accommodation was

fully restored, vision was normal in each eye with the first glass, and to secure binocular far and near vision, each cylinder was changed to 90°. This result may be due to the stimulus of accommodation exciting through the filaments of the third nerve, the superior recti in each eye.

It is true that with the cylinders at 90° in each eye remote vision of the bars and types was normal. This can only be accounted for on the supposition, that, even in *remote vision*, there must have been present accomodation. It is also true in this case that this ametrope developed = + 4.5 astigmatic hyperopia in each eye under duboisine, but accepted only a + 3.5 cylinder when the effects of the mydriatic had passed off. He therefore was exercising = + D 1.0 of accommodation for distant vision, and it is probable this would stimulate the superior recti sufficiently to change the axis of rotation in binocular remote vision, to 90° each eye. This man's unaided near point was 19 cm. = D 5.3, and as he had = 4.5 D of hyperopia, his accommodation was = +4.5 +5.3 + 9.8 D, which is equal to what he should have had at 20 years of age. In correcting + 3.5 of the astigmatism he would possess an excess of accommodation = 9.8 — 3.5 = 6.3 D in proximal vision.

Miss M. C., aged 30 years. Without duboisine and with — 1.0 ⌒ —0.75 cyl. ax. 25°, V. R. E. = $^4/_4$, and with — 1.25 ⌒ — 0.75 cyl. ax. 150°, V. L. E. = $^4/_4$, $V_2 = {}^4/_4$. In binocular vision at one metre the right cylinder gave only normal vision when the axis was turned to 180° or 0°, or horizontally. Then the floor was also level, the bars alike and types seen normally in far and near vision. After the effects of the mydriatic had passed off these results held good.

Miss A. B., æt. 23 years. Without mydriatic and with — 0.5 ⌒ + 0.25 cyl. ax. 180°, V. R. E. = $^4/_5$, and with — 1.75 cyl. ax. 180°, V. L. E. = $^4/_6$ and $V_2 = {}^4/_5$, and $^{\cdot 6}/_{\cdot 30}$ D. On using duboisine the formula became — 0.25 cyl. ax. 145° and V. R. E. = $^4/_5$ and $^{\cdot 6}/_{\cdot 28}$; and — 1.0 ⌒ — 1.25 cyl. ax. 180° V. L. E. = $^4/_5$ and $^{\cdot 6}/_{\cdot 28}$ and $V_2 = {}^4/_4$ and $^{\cdot 6}/_{\cdot 28}$. Now the object-board sides were parallel, the floor level, and the bars normal. But the tests for binocular vision were not normal when the axis of the right

cylinder was placed at 180°. These glasses held good subsequently.

It may be claimed that the foregoing results are due to our not having found the correct axis in the monocular tests of each eye. This assumption would be untenable because every care was taken in correcting each eye singly, both in far and near vision; but on attempting binocular vision, especially at one metre or less distance from the ametrope, the sides of the object-board were not seen parallel, nor the floor level. When the axis of one or both cylinders was changed then, and then only, binocular vision-tests became normal. But in these cases the axes of the cylinders did not correspond. The explanation given may not be the true solution, and accomodation may have a direct influence in the result by changing the focus of individual sectors of the crystalline lens, but the fact remains that there is such a phenomenon as *binocular astigmatism.*

If in calling your attention to this subject I shall induce any to investigate it and possibly determine the true solution, I shall rest content with the result.

ON THE "CANDY"-TREATMENT OF CONJUNCTIVAL AFFECTIONS.[1]

BY ADOLF ALT.

MR. PRESIDENT AND GENTLEMEN.—Before reading the following I wish to state that this paper is in no way prompted by any personal feeling, and that I want it thoroughly understood that I am not attacking men, but what I think perverted science.

In the April number 1888 of the *St. Louis Courier of Medicine*, Dr. H. L. Wolfner, assistant to the ophthalmic department and lecturer on the use of the ophthalmoscope, St. Louis Post-Graduate Medical School and Polyclinic, publishes a paper, which has probably been read by a great many of you, entitled "*Criticisms on the Present Mode of Treating Conjunctival Affections, with Suggestions for the use of a new Remedy*," which I would surely have let pass unchallenged, if some statements contained in the paper did not make it appear, at least, as if the author was only the mouthpiece of a gentleman whose name in this community is too well known, and whose authority might, therefore, be too weighty to allow this matter simply to be overlooked.

When I wrote the title of this paper, I did so on account of the new remedy for treating *chronic* conjunctival affections which the author recommends, namely, molasses. Although for all I know, it may be an excellent remedy, and although the criticising author got it by hearing of a quack who used something that looked like it, yet, the very thought of using

[1]Read before the St. Louis Medical Society, May 5, 1888.

"molasses" in the eyes appeared to me to be so ludicrous that for the time it overpowered all other impressions left in my mind after the perusal of the author's paper. I saw before me a whole waiting room full of patients with chronic conjunctival affections, on a hot St. Louis summer day, their eyelashes shining and glued together with the sweet stuff, and the flies buzzing about and trying to get a taste.

Yet, let alone these funny ideas! The object of my paper is a considerably more earnest and important one, since it will deal with teachings sent out to the general practitioner on authority.

The paper above referred to has for its object, as stated in its introductory lines, *to criticise the present mode of treating acute conjunctival affections.* It goes on to say:

"In looking over the text-books and monographs written on this subject, it will strike even a casual observer as curious that ophthalmologists should all agree to use the same remedies in the treatment of acute conjunctival affections."

A queer criticism, indeed. Why should not all ophthalmologists use the *same* remedies in any given disease, or for that matter, all doctors, provided that the remedies be good ones? And do we not all, even the author of the paper, do this very same thing continually?

This criticism, however, poor as it is, must appear the stranger since, as far as my knowledge and experience go, it is not the case, as the paper has it,

"That the list of the remedies used by all oculists in acute conjunctival affections begins with sulphate of zinc or boracic acid, and ends with nitrate of silver, and comprises all therapeutic agents commonly known as astringents."

In the first place, every ophthalmologist who has not come down to the level of a mechanic, individualizes his cases, and

according to his experience treats every case on its own merits. *In the second place*, what does the paper mean with *acute* conjunctival affections? As it later on appears, it includes *every* form of *acute* conjunctivitis, from a simple hyperæmic condition to the gonorrhea of the conjunctiva—a large field, indeed, to be covered by one remedy or one method of treatment, which, as we will see later on, the paper recommends. *In the third place*, in almost all the text-books I looked over, and they are a goodly number, nitrate of silver is the chief remedy recommended in acute catarrhal conjunctivis and blenorrhea. *In the fourth place*, nitrate of silver is not usually classed as an astringent, but as a caustic.

The paper, therefore, throws diseases and remedies of a very different character into one pot, giving the casual reader the impression that oculists, *as a class*, are not a very scientific body of professional workers. Against this idea I want to enter a *most emphatic* protest. Of course, there are ophthalmologists and ophthalmologists, but as little as it discriminates with regard to diseases and the usual remedies—as little does this paper discriminate between the mechanic and routine worker and the large class of honest and honorable workers. This latter class the paper tries in the eyes of its readers to belittle by any means, in order to gain the more for its own recommendations of a yet much more indiscriminate cure-all.

The paper evidently hits *us other* ophthalmologists the hardest, at least in the author's intention, when it fires at us the following remarkable shot:

"If specialists are asked why do you use astringents in this class of diseases, the answer is, invariably, that their patients get well under their use, and therefore why should they discard them?"

Has the author any better reason to offer for the use of a remedy than the one which he tries here to throw into our faces? Does *he*, perhaps, recommend his remedy because the patients do *not* get well under its use? This absurd objurga-

tion is followed up by another equally remarkable statement, viz., that

"The physician will do a certain thing simply for the reason that his grandfather did the same, not because his common sense dictates any such line of treatment."

The author of the paper was assuredly not for a moment aware how grossly he, *himself*, a physician and ophthalmologist, insulted with these words the host of medical men, who, *however progressive*, have enough left of the true conservative spirit to gratefully thank their grandfathers for having brought our science to what it was when we began to take the trust, and who, *however conservative*, have the true spirit of progress and are eager to learn and help to find new remedies and appliances for the relief of suffering humanity; and, further, to apply it as soon as they have found out that the new is better than the old; men, who never forget that the to-day is but the child of yesterday, but who work to help to make more glorious and more blissful the to-morrow.

This fling at the profession is the worse, since it is backed by the following statement, which seems to me to give the main reason for the writing of the remarkable paper. It states as follows:

"Dr. Michel, several years ago, 1878 or 1879, read before the State Medical Society a paper on this subject, in which he denounced the use of astringents in acute conjunctival inflammations, and gave his reasons for abandoning their use. For some reason or reasons the profession at large has not accepted his suggestions, and prefers to travel in the same old rut, which leads to an immense number of cases of chronic inflammatory granulations."

Now, if a scientific paper does not receive the general acclamation which its author, and but naturally so, thinks its due, is that a reason why he should accuse the whole profes-

sion, if, even implicitly only, of neglect? I, myself, for instance, have never been so fortunate as to see or even to hear of the paper just mentioned until I read the article at present discussed, and I dare say a good many more members of the profession are in the same position. Even a thoroughly *good* paper, when buried like this, may share such a fate. But would it not be more natural to think that by accident the suggestions of Dr. Michel have not become known to many, or, that they have, perhaps, been tried by others and have not yielded in their hands the same results? These would surely be more appropriate explanations. The author, however, not satisfied with saying that, for some reason or reasons *the profession at large has not accepted these suggestions, etc.*, adds, *which leads to an immense number of cases of chronic inflammatory granulations.*

Here we have it, as it were, in a nutshell. The professsion, or to say it plainly, ophthalmologists at large, by their *bad* practice, bring about "*an immense number of cases of inflammatory granulations.*" The deductions from this accusation, gentlemen, I leave to you to make.

Not forgetting the fact that *not* astringents, but caustics and antiseptics are now commonly in use in the treatment in acute conjunctival affections (which is contrary to the author's statements), we will now see what reasons he offers *against* the use of astringents. Although fighting, as you see, against a straw-man, set up by himself, the author has to offer a *new* theory, but *without proof*, as he says: "*Experiments are now being made by Dr. Michel to prove that the explanation offered is* the true one.[1] From the fact that the pain originally caused by astringents applied to the conjunctiva subsides after a number

[1]In the discussion following the reading of this paper, Dr. Wolfner stated, that after having dropped nitrate of silver into a rabbit's eye for several weeks, he found the corneal epithelium several times thicker in that eye, than in the fellow which had been left alone. This is the alleged proof of the theory above referred to. The gentleman stated further, that nitrate of silver did not *injure* the inflamed conjunctiva because the tears changed it at once into the inert chloride of silver! What then, I ask, causes the eschara?

of applications, we are asked to believe on authority that the continued irritation caused by the astringents produces "*a hypertrophy of the epithelial tissue*" not of the *conjunctiva* as we would expect, but "*of the cornea.*" *Corns on the cornea*, as it were. Indeed, the paper says: "*The thick horny, epithelial masses in the laborer's hand, and corns on the feet are caused in this way.*" Even granted that this might perhaps be true, what, I ask, have these corns on the cornea got to do with the "*immense number of cases of chronic inflammatory granulations*" which the paper accuses all oculists of producing, who may be in the habit of using astringents in acute conjunctival affections?

Surely the writer did not means to accuse us of two such horrible crimes? The paper goes on to say:

What then is the proper treatment for acute inflammations and congestions of the conjunctiva ?" Again, there is no discrimination at all between congestion and inflammation, or between the different forms of conjunctival inflammation.

But, what is *ex cathedra* given to us as the *proper* treatment in *all* these cases? Listen:

"Drop nothing into the eye that will irritate, and therefore not even a drop of water. [I suppose on account of the danger of producing corns on the cornea, or chronic inflammatory granulations, ALT]. Use soothing applications to the closed lids, either hot or cold, whichever is more grateful to the patient. Most cases will be benefited more by the use of compresses wrung out of a cold solution of opium than by anything else. The compresses should be light, and should be frequently dipped into the solution, each application lasting between fifteen minutes and a half hour, and repeated four times a day. In addition to this apply a bland, unirritating unguent to the lashes before retiring, and in this way prevent the lids from gluing together in the morning."

Now comes the most noteworthy statement:

"Purulent and gonorrheal ophthalmia should be treated exactly in

the same way, except that the solution and salve must be used more frequently and the parts kept scrupulously clean. No irritating drops no syringing out the conjunctival sac with warm water, no nitrate of silver, no bichloride of mercury, and your patient will get well. This plan of treatment has always been used in the eye department of the Polyclinic, and we have to record the first failure. This will not be believed by most ophthalmologists [most assurely not, ALT], yet it is a fact, nevertheless, that not one of our cases of purulent or gonorrheal ophthalmia has resulted in loss of vision, or had even an ulcer of the cornea, unless the patient was seen after these changes had already taken place."

With all due deference to these most fortunate experiences at the Polyclinic with this mode of treatment, I would just like to ask what is the exact number of cases of purulent and gonorrheal conjunctivitis so treated? Truly the experience gained in the largest possible number of cases seen at the Polyclinic in the few years of its existence can only be very minute, when compared with the experience of all oculists the world over who have for many years treated such cases. Such teaching is, according to the accumulated experience of the vast majority, absolutely *bad teaching*, and woe is to the majority of eyes affected with purulent and gonorrheal conjunctivitis, if *this teaching is listened to.* Indeed, this is even worse, than what the midwives do, to whose account thousands of lost eyes still fall every year. They at least try to wash the newly born babes' eyes with chamomile tea, or mother's milk. All over the world honest doctors are trying to teach the people *rational* medicine (although it be empirically come to): all over the world oculists try to free the people of this, the most fruitful source of blindness, viz., purulent and gonorrheal conjunctivitis, by teaching and ordering absolute cleanliness and the continued and careful removal of all pus from the conjunctival sac, whether it contain in reality a specific germ or not; and all over the world immense good has come and will yet come from such teaching. And here, in 1888, this paper goes out, at least into our immediate neighborhood, and tries to

teach you to go back to the old evils, to undo all that may, perhaps, by progressive science have been accomplished.

Here again, therefore, I want to enter my most emphatic protest. If the author of that paper is willing to abide by his teachings until dire results have shown him their fallacy, let *him* do so, but do not *you* follow him. The blinded babe or adult, will, according to the opinion of the vast majority of men of thought and learning, have a right to curse you, and will do so assuredly, let alone the pangs of your own conscience.

There is one more sentence in this paper, which I can, even at the risk of tiring you, not silently let go by. It says:

"Eye specialists, as a rule, pay very little attention to general pathology, and it is for this reason and astringents, that so many chronic eye cases are seen."

Whoever has had a chance and the inclination to follow scientific ophthalmology in its rapid and enormous progress, and the author of that paper as an eye-specialist and teacher surely should, if he has not done so, knows, without my stating it, that *no* specialty has so continually and preeminently paid attention to general pathology. *No* speciality has so helped in the progress of the knowledge of general pathology, as ophthalmology has done, and is doing to this day. I need not dwell on this. Every one of you knows it. This statement again then is surely not applicable to the vast majority of oculists. To be sure, if dosing every nine eye-patients out of ten with some iron mixture, means paying attention to general pathology, then, and then only, is the statement correct.

If that paper is starting in a new era of scientific communications, if it is to be in future the correct thing to try and force one's own ideas upon the profession, by flinging mud at all that may be of a different opinion, and by speaking in sneering terms of the profession at large, why then science is to be pitied indeed.

Mr. President and Gentlemen, I do not like the idea of posing before you as a champion of what I consider science.

If I appear to have done so, I have done it with reluctance. I felt that *somebody* had got to do it, and that such a paper, full of sentences such as those I have drawn your attention to, could not be allowed to go forth unchallenged, and so reluctantly *I* did it. But, allow me to emphatically state here again, that no *personal* motive prompted me, and I hope my strictures will not be taken in that light. I should much rather prefer to have it all—"Molasses."

AMERICAN MEDICAL ASSOCIATION.

We regret to have to notify our readers that Dr. D. De Beck, of Cincinnati, who had kindly consented to write us a report of the work done in the Ophthalmological Section, was by sickness prevented from doing so. The only synopsis of a paper read there which we have to offer is the following one by Dr. J. J. Chisolm, of Baltimore.

V—$^{20}/_{20}$ AND NO 1 BRILLIANT NOT INCOMPATIBLE WITH ANNOYING ASTIGMATISM.

At the last meeting of the National Medical Association, Dr. Julian J. Chisolm, of Baltimore, read a paper before the ophthalmological section, on the value of the 0.25 Dioptric cylinder in the correction of low degrees of astigmatism, giving as the basis of his paper his personal experience for the year 1887, as taken from his office case book. He had prescribed cylinder glasses for 493 patients, but as many of these had eyes which differed in kind, degree and angle of the faulty meridian, he thought it best to classify them as 986 eyes. Of these 546 exhibited a small degree of irregular refraction which 0.25 dioptric cylinder corrected.

These patients were most frequently the advanced students of the higher schools and were doing forced eye work. They usually had V=$^{20}/_{xx}$ and could read No. 1 of the test types. A weak minus glass would sharpen distant outlines.

The first point made was, as these patients suffered when their eyes were used and weak cylinder glasses corrected the fault and removed the eye discomfort, V=$^{20}/_{xx}$ was not incompatible therefore with annoying forms of astigmatism.

The next point brought out was that when the astigmatic

dial was carefully examined, 0.25 c dioptric would correct the faulty lines and that 0.5. c. would over-correct. The most frequent faulty meridian was the horizontal, then the vertical and finally the oblique, and that the latter caused the most trouble. That when eyes possessing the low degree of astigmatism broke down under the pressure of hard study, they became extremely irritable and could not be used. A few minutes of reading would cause eye pain and headache, and that even the light of day was uncomfortable requiring the use of smoked glasses. Rest did these eye no good, if it was again to be followed by hard work. Cylinder glasses alone would relieve the irritation, and often they had to be constantly worn to give permanent comfort. The 0.25. D. cylinder was the lens which removed all the discomfort and permitted the eyes to be freely used. Dr. Chisolm had often to substitute 0,25 D. c. for 0.5 D. c. brought from other specialists with the complaint that the eyes were still painful. When the stronger glasses were discarded and the weaker ones were used, all pain disappeared. The conclusion drawn from these experiences was that ophthalmic surgeons who would not recognize less than a 0.5 diopter of astigmatism discharged a large number of their astigmatic patients unrelieved.

A third point made in the paper was that in nearly all cases in which patients were annoyed by this low form of astigmatism the kind and the angle of faulty curvature was changed under the action of atropia, a—0.25—0° becoming a+0. 25. 90°. Should the+lens be prescribed as the eye under atropia called for, they could not be as comfortably worn as would be the concave cylinder which the faulty vision required for its correction before the use of atropia. In other words, that in the low degrees of astigmatism atropia gives a fictitious condition which is very misleading in practice. In the majority of such cases of astigmatism he does not use atropia for the adjustment of lenses. Only in cases in which the lens first given does not bring comfort, is atropia used to confirm the diagnosis or more especially to establish the angle in cases of doubt.

The chief object of the paper was to call attention to the

necessity of recognizing the 0.25 D cylinder lens as one of the most valuable in the trial case for the relief of headache and eye pains, and that these weak degrees of astigmatism often would cause in the student much more annoying reflex troubles than would the greater degrees of astigmatism in older persons whose eyes are not worked under so great a pressure.

The accompanying table exhibits the kind, degree, and angle of the astigmatic fault proportionally in the cases treated.

TABLE I.

SHOWING THE DEGREE OF ASTIGMATISM IN 986 EYES PRESCRIBED FOR IN THE OFFICE PRACTICE OF DR. J. J. CHISOLM, OF BALTIMORE, MARYLAND, DURING THE YEAR 1887.

No.											Degree.
546	-	-	-	-	-	-	-	-	-	-	0.25 D.
171		-	-	-	-	-	-	-	-		0.5 D.
66	-	-	-	-	-	-	-	-	-	-	0.75 D.
60		-	-	-	-	-	-	-	-		1. D.
35	-	-	-	-	-	-	-	-	-	-	1.25 D.
22		-	-	-	-	-	-	-	-		1.5 D.
10	-	-	-	-	-	-	-	-	-	-	1.75 D.
27		-	-	-	-	-	-	-	-		2. D.
8	-	-	-	-	-	-	-	-	-	-	2.5 D.
11		-	-	-	-	-	-	-	-		2.25 D.
5	-	-	-	-	-	-	-	-	-	-	2.75 D.
12		-	-	-	-	-	-	-	-		3. D.
6	-	-	-	-	-	-	-	-	-	-	3.5 D.
2		-	-	-	-	-	-	-	-		4. D.
1	-	-	-	-	-	-	-	-	-	-	5. D.
1		-	-	-	-	-	-	-	-		5.5 D.
3	-	-	-	-	-	-	-	-	-	-	6. D.

TABLE II.

Showing the Direction of the Error of Refraction.

No.	Angle.
267	—0.25°
90	—0.25⁹⁰
79	—0.25 oblique.
29	+0.25°
85	+0.25⁹⁰
16	+0.25 oblique.
63	—0.5°
23	—0.5⁹⁰
37	—0.5 oblique.
6	+0.5°
28	+0.5⁹⁰
14	+0.5 oblique.
23	—0.75°
9	—0.75⁹⁰
15	—0.75 oblique.
4	+0.75°
10	+0.75⁹⁰
7	+075 oblique.
15	—1.°
6	—1.⁹⁰
15	—1. oblique.
1	+1.°
13	+1.⁹⁰
10	+1. oblique.
9	—1.25°
5	—1.25⁹⁰
12	—1.25 oblique.
0	+1.25°
5	+1.25⁹⁰
4	+1.25 oblique.

THE STATE MEDICAL SOCIETY OF ARKANSAS.

OFFICE OF THE SECRETARY.
LITTLE ROCK, MAY 15, 1888.

EDITOR AMERICAN JOURNAL OF OPHTHALMOLOGY.—In compliance with instructions I transmit herewith the following resolutions adopted at the thirteenth annual session of the State Medical Society of Arkansas, held at Fort Smith, April 25, 26 and 27, 1888, and ordered to be furnished to the American Medical Association, the medical and religious press, and to the State Medical Societies, soliciting their co-operation in bringing about a correction of these grievous and palpable errors:

Resolved, That the members of the State Medical Society of Arkansas have for years observed with pain and mortification the patronage given to charlatanism in all its multifarious aspects by the religious press of our country.

Resolved, further and most specifically. That the appearance in religious papers, ostensibly published for the inculcation of truth and morality, of serious homilies on prayer and praise side by side with cures for consumption, cancer, Bright's disease and other incurable ailments to which an editorial endorsement is often given, as well as secret preparations under the cloak of remedies for disease, but really intended for purposes of fœticide and other immoral uses, largely tends to shake the confidence of the profession of medicine in the integrity and purpose of the managers and editors of such journals.

Resolved, further, That it has been the well known custom of the profession to render services gratuitously to clergymen, which we do not regret nor do we propose to recall, yet we must assert that the frequent occurrence of endorsements and recommendations of the clergy of peripatetic doctors and advertising charlatans has in many instances been the only reward of our gratuitous services.

Resolved, further, That we are aware that the editors of religious newspapers admit the painful situation in which these

advertisements place them, and attempt to excuse themselves by saying that it is necessary to take these advertisements in order to obtain means to conduct their papers; but, in the language of orthodox theology we would say: "Put behind you that damnable doctrine that we must do evil that good may come."

Resolved, further, That, as a society, we declare that the continued perpetration of the above offenses by some of the clergy and religious press brings harm to the bodies of their constituency, and damages materially their influence upon the thinking class of the medical profession.

Resolved, That the secretary be instructed to furnish copies of these resolutions to the religious and medical press of the United States, to the American Medical Association and to the state medical societies, soliciting their co-operation in bringing about a correction of these grievous and palpable errors. Very Respectfullyly.

L. P. Gibson, M.D., Secrerary.

TRANSLATION.

FRENCH SOCIETY OF OPHTHALMOLOGY.

The following passages are translated from a report in the *Semaine Médicale:*

May 8. *M. Panas* (Paris), read a paper on

Enucleation in Panophthalmitis.

According to von Graefe the operation of enucleation of the eyeball during the course of panophthalmitis is looked upon as something very grave, and likely to produce fatal meningitic complications.

In order to give this theory its just due I will relate the following observation, which is of great importance.

A man recently came to see me who suffered from a panophthalmitis subsequent to an operation. The eyeball was enucleated, although the suppuration was in full progress, but it was done under the most rigorous antiseptic precautions: washing, drainage and conjunctival suture. The second day after this operation the patient made some complaints, and was examined, and a pleuritic effusion was detected, which we diagnosticated as being of septic origin. A few days later the patient died. At the autopsy we found an extensive purulent meningitis, a sero-purulent pleurisy and multiple abscesses in the lungs. All of these suppurative lesions contained the same micro-organisms: the staphylococcus albus mixed with a smaller number of streptococcus, and these were in abundance within the panophthalmitic eyeball.

The patient had, moreover, been suffering from an old interstitial nephritis.

To sum up, the extent and the multiplicity of the infectious lesions prove, that they were coincident with the panophthalmitis before the operation of enucleation. The similarity between the micro-organisms found in the eyeball and in the different suppurative foci within the other organs, confirms this view materially.

This observation, therefore, shows that the infection comes from the panophthalmitic eye and by way of the sheaths of the optic nerve is carried into the meninges and from there to other organs.

From such a consideration we must at once draw this practical conclusion, that we must prevent the general infection of the body, and enucleate as quickly as possible the primary focus of infection, that is, the panophthalmitic eyeball.

You see, this conclusion is in conformity with the actual laws of general surgery, which prescribe the total extirpation of local foci of infection, but it absolutely contradicts the principle formerly laid down by von Graefe concerning operative interference in panophthalmitis.

I want to offer, therefore, the following conclusions:

The enucleation must be made the moment that we find that our efforts to arrest the progress of the suppuration of the eyeball are unsuccessful.

Even when the panophthalmitis is at its height we should enucleate, but under the express condition, that there are as yet no symptoms which might indicate a generalization of the infection, and that the patient has no organic disease, as albuminuria, diabetes, etc.

Of course, the antiseptic measures during the operation must be of the most rigorous.

Discussion.

Dr. Dufour (Lausanne).—In performing enucleation during a panophthalmitis we often obtain good results, and I have

seen it more than once in my practice. But there are also unfortunate cases which end fatally, and these show that the operation creates a combination of circumstances which is favorable for a general infection.

Dr. Abadie.—I have always been greatly astonished to hear the proposal to enucleate an eyeball during an attack of acute panophthalmitis, and this the more so, since this proposition is always made after a number of deaths have followed the operation.

When panophthalmitis shows itself at first, the morbid process is, so to speak, intra-ocular. If you remove the eyeball without a very careful dissection of Tenon's capsule, you disseminate the infectious material into the orbital cellular tissue, and you expose the patient to a diffuse suppuration, and a purulent and fatal meningitis.

However this may be, the statistics with regard to this point are clear, the fatal cases in consequence of enucleation are infinitely rare. But, when they occur it is almost always in cases of panophthalmitis. This is so true, that three years ago Prof. Alfred Graefe (Halle), frightened by two successive fatal cases after enucleation on account of beginning panophthalmitis, has proposed to give up this operation altogether, and to adopt in its stead that of evisceration. I admit, that I still prefer this operation to enucleation. I consider it less dangerous; but it has the inconvenience of causing very considerable pain for several days. I prefer to make a large horizontal incision into the eyeball which lays the tissues bare, removes the pain and is absolutely inoffensive, as I have never known death to follow this operation.

Dr. Motais.—In order to find in how far the enucleation of a panophthalmitic eyeball is really responsible, it would be necessary, it seems to me, to find the number of cases in which death from meningitis followed panophthalmitis without a surgical intervention. I have seen two cases of this kind. We have, therefore, a right to ask in case of death after enucleation, whether the operation was the cause of the panophthalmitis, or whether the patient had been infected previously.

Moreover, if on the one hand, the operative injury may be accused of having incited the progress of the inflammatory accidents, on the other hand the enucleation offers a large space for the influence of antiseptics. I agree, therefore, with Dr. Panas, and I prefer enucleation in panophthalmitis. I must, furthermore, add that I have never seen death follow it.

Dr. Gayet.—I am going to add a few words only to what Dr. Motais has said, with whom I agree perfectly. I have operated in more than sixty or eighty cases of panophthalmitis, and have had only one fatal accident in a case in which the patient was infected at the time of the operation, like the patient whose history Dr. Panas has just related. We cannot say that the enucleation brings with it the generalization of the inflammation, since the contrary takes place, and we observe that the inflammatory symptoms subside at once after the operation. Finally, the large incision into the eyeball gives only a momentary relief, and evisceration is the more dangerous since it allows the inflammatory symptoms to go on.

Dr. Fieuzal.—I perfectly agree with these remarks, since in every case in which I made a crucial incision I had afterwards to perform enucleation.

Dr. Meyer.—The gist of the experience which is here represented by the colleagues who took part in this discussion, shows that we can perform a great many enucleations in panophthalmitis without having to deplore one fatal case.

This undoubted fact should, however, not lead us to forget, that the well known fatal accidents after enucleation have taken place especially, when enucleation had been performed at a period in which panophthalmitis was complicated by phlegmone of the orbital tissue. On the other hand, the autopsies in these cases have shown the existence of purulent meningitis which had its origin in the orbit. It, therefore, seems to me, that the greatest prudence and reserve cannot be superfluous, when we are confronted with a case of panophthalmitis accompanied by phlegmone of the orbital tissue.

Where this latter complication does not exist, I do not hesitate to perform enucleation. This operation seems to me to be

greatly preferable to all other surgical intervention,like the large transverse incision, and evisceration. The first does not avail anything, because it does not remove the purulent matter enclosed within the eyeball which is too thick to run out. Eviscera tion has only one advantage over enucleation, that it leaves a better stump for the artificial eye ; this advantage, however, is too dearly bought by the long painful days which we gladly would spare our patients.

Dr. Vacher.—I prefer enucleation to evisceration just on account of the form of the stump, since in evisceration the eye shrinks in a way which is very disagreeable.

Dr. Dianoux.—I find that the observations of Dr. Meyer, concerning enucleation during a panophthalmitis are not very justifiable. In fact, this disease in itself is infectious, and the operation logically is less important as a cause of infection than the inflammatory affection itself. In one word, it is not proven that the operation disseminates a disease which in itself has the tendency to become general.

Dr. Meyer.—The question put by Dr. Motais, whether we must attribute the origin of fatal accidents to the phlegmone of the orbit or to the surgical interference, can only resolve itself, it seems to me, in the establishment of statistics of panophthalmitis with orbital phlegmone. In this way the question will be cleared up, whether such cases, when left to themselves, are frequently mortal, or whether these dire results happen in a greater number in the cases in which an enucleation has been performed.

Dr. Coppez.—I have abandoned enucleation in panophthalmitis in consequence of having to deplore two cases of death when practicing it. Moreover, in these cases the operation is fraught with extreme difficulties. I much prefer exenteration, which quiets the panophthalmitic pains as much, and even more so, than enucleation.

Dr. Galezowski.—I have not in a single instance brought myself to enucleate an eye on account of panophthalmitis. How must one feel in proposing in private practice to remove an eye which was originally operated upon by the extraction

of cataract, and how, if death ensues from this operation, as has happened to Dr. Pagenstecher?

Dr. Martin (Bordeaux).—It would be well to know how many of the fatal cases of enucleation in panophthalmitis belong to the pre-antiseptic period, and how many have happened since the introduction of these new methods of wound treatment.

Dr. Bravais.—Dr. Gayet (Lyons) has always enucleated eyes attacked by panophthalmitis and successfully so, even before the antiseptic period.

Dr. Panas.—In this whole question, which is yet *sub judice* and which I consider far from being solved, the principle point is to exactly find the indications and counter-indications of the operation. Certain it is, that death after enucleation in panophthalmitis must have certain special causes, since not all of these patients succumb, and since these accidents on the whole are rare. The eye constitutes a focus of infection which is very apt to throw morbific germs into the remainder of the body by way of the lymphatic sheaths of the optic nerve. If the general infection does not supervene in all of these cases, it is because a patient with a sound constitution has been able to react and to destroy the morbific germ as soon as it appeared. If on the other hand the patient is sick, as in my case in which he was albuminuric, he forms, so to speak, a field of less resistance and is very apt to allow the infectious disease to propagate; in such cases these accidents will be observed.

Is it therefore necessary, in these cases even, to abandon enucleation and to return to the incision of the eyeball?

The incision of the eyeball is of no value, since the intraocular pus is solid and does not come out; even evisceration is valueless, since, as has been said, this operation is followed by the most violent pains. Enucleation, therefore, remains the only remedy in order to quiet the pains and, in performing it, we act according to the general surgical rules, which teach us to remove totally every focus of local infection as soon as it is possible.

ACADEMY OF MEDICINE.

On the Usefulness of and Principal Indications for Injections of Antipyrine in Ophthalmology.

BY DR. GRANDCLÉMENT, OF LYONS.

For three months I have studied the indications and the best mode of administration of antipyrin in the treatment of eye affections. From the first I have found that injections of antipyrine at the temple yielded quicker and more certain results than the administration of this drug by the mouth. In exceptional cases only I combine the two modes of absorption. In the second place, when the injections are useful and efficacious, the improvement appears right after the first injection; and then four or five injections suffice usually to get the full effect of the drug. I have made in this way more than 300 injections, consisting of 25 centigrammes of antipyrine in 10 drops of distilled water with a half a centigramme of muriate of cocaine. This was never followed by the formation of an abscess, yet, the region of the injection becomes always slightly swollen and is painful to pressure. This swelling lasts from six to eight days and often extends in the shape of an œdema down to the lower eyelid.

I think, that when the injections are successful the greater part of their efficacity is probably due to this kind of subcutaneous revulsion, combined with analgesia of the skin at that place.

The indications of these injections in eye diseases, I formulate in the following general proposition:

The injections of antipyrine at the temple are successful:

1. Quickly and almost always against ocular and especially peri-orbital pain.

2. Often also, but less promptly and certainly, against spasm.

3. Finally, they modify favorably the majority of inflammatory processes of the eye-ball, especially when they are accom-

panied by ciliary pain. This favorable action upon the progress of the inflammation is the more evident, the more pronounced is the pain.

CORRESPONDENCE.

Macon, Ga.

Editor American Journal of Ophthalmology.—Sir, referring to Dr. C. W. Hobby's article on "an operation for pterygium" in the April number of your journal, I have to say: It is the operation I nearly always make for pterygium, having learned it from my preceptor, Dr. A. W. Calhoun, of Atlanta, Ga. Whether it was originated by him or not I am not certain, but my impression is it was. I have employed it for about five years. Very respectfully

R. O. Cotter.

OBITUARY.

JOSEPH AUB.

The death of Dr. Aub, of Cincinnati. was sudden and unexpected, even to those who knew that he had not enjoyed vigorous health for a few years past. He continued in active practice until about three months ago, when he went South in hopes that the change would benefit him. But he returned without relief, and albuminuria rapidly developed. This with the chronic heart trouble which remained after an attack of acute rheumatism a few years ago, rapidly carried him off. His career was short but remarkably successful, and he lived to the age of 43, just as he was realizing the results of his years of professional work. He was born and educated in Cincinnati and graduated in 1866 at the medical college of Ohio. He went abroad and studied ophthalmology in Vienna, London and Berlin, and returned to New York and for some time was an assistant to Dr. Knapp of that city. He began the practice of his speciality in 1872, and from the first his professional career may be said to have been a success. He had a large and influential circle of friends who gave him their confidence at once. His excellent opportunities for study at home and abroad gave him an advantage which few men have. His practice grew rapidly, and in his devotion to it he neglected to pay that attention to his own health which it demanded. He was a member of the staff of the Cincinnati Hospital from 1871 to the time of his death, and for five years was professor of ophthalmology in the Cincinnati Medical College. He was an occasional contributor to this and other medical journals, and his papers were always clearly written and

contained the results of practical observation which were of value to others. The profession has lost an earnest worker and a devoted student in the death of Dr. Aub.

S. C. Ayres.

EDWARD GREELY LORING, M.D.

Edward Greely Loring, M.D., died suddenly in the street on Monday afternoon, April 23, in the fiftieth year of his age. It was not known to his friends, and probably not to himself, that his health had undergone any deterioration, and on the day of his death he attended to his practice as usual. It is understood that his sudden death was owing to heart disease.

Dr. Loring took his medical degree from the Medical department of Harvard University, in 1864. He soon came to New York, and for a time he was associated in practice with the late Dr. Agnew, whose death preceded his own by only five days. At the time of his death, and for many years before, Dr. Loring was one of the surgeons of the New York Eye and Ear Infirmary, and he had achieved distinction as an ophthalmologist. Indeed, in the field of physiological optics, and especially in that of ophthalmoscopy his pre-eminence was everywhere acknowledged. His "Text-Book of Ophthalmoscopy," the first volume of which was published in 1886, took rank at once as the standard American work on that subject. Not only was Dr. Loring's ability as an ophthalmologist generally recognized, but his qualities of heart endeared him to his patients and to all who knew him. As the shock felt on the announcement of his sudden death passes off, it will be succeeded by an abiding sense of the loss that the profession and the community have sustained.—*N. Y. Med. Journal.*

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ON THE USE OF MYDRIATICS IN DETERMINING ERRORS OF REFRACTION AND THE CORRECTION OF THE WHOLE ERROR SO DETERMINED.

BY HENRY DICKSON BRUNS, M. D., NEW ORLEANS, LA.

An optician given a dioptric apparatus to determine its focal length for objects infinitely distant, were this apparatus provided with a mechanism by means of which its adjustment might be and is momentarily altered, but which mechanism by the turn of a screw could be thrown out, would show a lack of common sense did he fail to turn the screw and reduce the problem to its simplest terms.

This is the problem with which the oculist is confronted when called upon to restore the ease of normal function to a human eye, unable by reason of a refractive imperfection, to perform without pain the task imposed by an ever more exacting civilization.

The first step in the restoration to comfort of one of these incapable eyes, is to determine the refractive error that causes the images of distant objects regarded by such an eye in a state of rest, to fall either before or behind the position of its

retina. To the accuracy of this determination, the ciliary muscle opposes its incessant efforts, I believe, in the majority of cases eminently successfully. In atropia (and some other similar drugs) we possess a rapid, sure and painless means of suspending the action of the muscle; and yet, strange to say, an examination of our text-books seems to show, that the greater number of practitioners do not as a rule use these drugs in determining errors of refraction. Three classes of cases have to be dealt with (1), hypermetropia and the simple and compound hypermetropic astigmatisms; (2), myopia and the simple and compound myopic astigmatisms, and (3) regular mixed astigmatism, and the text writers differ as to the rules they lay down for the use of mydriatics in these different kinds of errors.

Soelberg Wells (Bull, 1883) only contemplates the use of a mydriatic in cases of hypermetropia and it should "only be applied in those cases in which it is of importance to know precisely the degree of latent H." (p. 643). "In myopia," says Juler (1884), "the employment of a mydriatic is not as a rule necessary, except in the case of young children, or when As. is present.

"In patients under twenty with H. or As., the accommodation should as a rule be paralyzed.

"In those who are slightly older—say 20 to 30—a mydriatic can often be dispensed with, provided, that in the event of the glasses not relieving the symptoms, an opportunity of retesting can be procured.

"After the age of 30 mydriatics are seldom necessary.

"No hard and fast line can, however, be laid down, and much will depend upon circumstances." (p. 405.)

Alt, in his Ophthalmology for the General Practitioner (1884), insists upon the necessity of using atropia in cases of H., but has nothing to say of its use in M.

In the American Edition of Carter's Treatise edited by Green, the former advises the use of atropia in cases of H. only, while the latter urges its use in M. alone.

Noyes writes (p. 60, Diseases of the Eye, Woods Library, 1881):

"Atropia is demanded if the neuralgic pain is great and accommodative spasm severe; also if visual acuity cannot be raised to $^{20}/_{XX}$. But if a convex glass is accepted which does not differ much from the ophthalmoscopic finding, and with it $V=^{20}/_{XX}$, and if with it Sn. No. 1 is read easily at 12 inches and the larger type at proportionate distances, and if the patient confidently expresses satisfaction in its use, atropia need not be employed. This course will be suitable with H. not more than $^{1}/_{16}$ and in persons under 30 (not speaking dogmatically) who have a good degree of accommodation. In them it is proper only to correct the manifest H., and they will seldom need at first more than $^{1}/_{36}$ or $^{1}/_{24}$. "We are to be much guided by circumstances, but in doubtful cases the patient should have the benefit of atropia."

Landolt (Examination of the Eyes, Burnett, 1879,) only uses atropia in exceptional cases, and thinks he can rely on the opthalmoscope.

Swanzy (1884) mentions the use of these drugs, but lays down no very clear rules for their employment.

Fenner (Vision and its Optical Defects, 1883) does not use a mydriatic. He corrects the Hm. and as time wears on increases the strength of the glasses.

DeWecker (Ocular Therapeutics, Forbes, 1879), says: "In practice we do not usually make use of mydriatics, which paralyse the accommodation, in determining refraction."

Giraud Teulon (The Function of Vision, Owen, 1880) evidently contemplates the use of a mydriatic.

Schweiger (Farley, 1878) limits the use of mydriatics to exceptional cases:

My thesis is, that the use of a mydriatic is absolutely necessary for the accurate determination of the refraction in every patient below the age of fifty or sixty; that in every case it is of the utmost importance "to know precisely the degree of latent H." Both in H. and M., the ciliary muscle retains a notable degree of power long past the age of thirty, and instinct and habit drive it to use this power to lessen in H., and increase in M. the degree of the refractive error we are en-

deavoring to discover. Lack of exactness is the opprobrium of medicine; while the boast of ophthalmology is that the use of the ophthalmoscope and the test-glass has well nigh raised it to an exact science. Yet no one can deny, that in every determination of refraction made without a mydriatic there lurks an element of uncertainty which it was in our power to eliminate, and failure to do so is a voluntary surrender of an exact for an approximative method. Although I have known men who had attained wonderful skill in the determination of refraction with the ophthalmoscope, yet I believe it vain to rely upon this instrument; the unrestrained, ever-varying ciliary muscle vitiates its results as it does those of the test-glass. For though the patient in the dark room *ought* to sit with his accommodation perfectly relaxed, he is almost sure to fix his attention on the object most clearly illuminated by the lamp, the nearest object within his ken. Every hypermetropic oculist must remember, that it was only after long practice he became able to relax his accommodation, and how difficult this is to do, without his correcting glasses, so long as any object remains within the field of vision; and yet this is what we demand of every hypermetropic patient whose refraction we undertake to estimate with the ophthalmoscope.

To these considerations the results of experience and experiment lend their weight. Of 51 cases in which the Hm. was determined, it equalled the Ht. in 11, came within 0.50 D. of it in 9, and within 1 D. in 9 cases; the difference being greater than 1 D. in 22 cases. Of 24 cases the Mm. equalled the Mt. in 2 cases, came within 0.50 D. in 6, and within 1 D. in 3 cases the difference being greater than 1 D. in 13 cases. In cases No. 1, 2, 3, 4, 5, every effort, save the instillation of a mydriatic had been made to discover the true refractive condition, but in vain. Were I at liberty to mention the name of the eminent oculist who declared the symptoms of case No. 1 to be due to hypermetropia, and then after an examination (conducted without the aid of a mydriatic), with test glasses and ophthalmoscope, withdrew this opinion and pronounced the refraction emmetropic, it would, I feel sure, be a guarantee to

every oculist in America that all possible skill in the use of these instruments had been brought to bear, and go far towards convincing them of the justice of my position. Case No. 5 is a striking instance of failure to discover the degree of a myopic error. The patient had been under the care of two distinguished practitioners of our specialty, and had been equipped with no less than four pairs of spectacles, yet none of these represented the error actually present. In all of these specimen cases the sole cause of failure lay in neglecting to employ so simple an expedient as the instillation of a mydriatic. They are most forcible and eloquent arguments.

Many incidental advantages also are derived from the use of mydriatics. Tired eyes are given a period of absolute rest before beginning again their accommodative labors, and during the time the ciliary muscle is slowly recovering its power, whatever glass may have been prescribed is more readily accepted; insufficiency of the recti muscles, due to overstrain wholly or in part passes away (cases No. 7, 8, 11 and 18); intractable blepharitis is put on the high-road to recovery (case No. 1) and recurrent styes (case No. 9) dissappear to return no more, under the relief afforded by the wearing of correcting glasses. Without the use of a mydriatic the true nature of cases Nos. 10 and 11 might easily have been overlooked for the symptoms of accommodative spasm were very slight. Indeed I believe that each was in the act of passing over into myopia, a process which Dr. S. D. Risley, of Philadelphia, has proven does take place, and that the employment of the drug led to their certain detection and relief.

The facts then seem to sustain fully the following propositions:

1. Without the use of a mydriatic, it is impossible to determine with indubitable accuracy the total amount of refractive error in cases of H. or M., the action of the ciliary muscle causing the former to appear less, the latter greater than the degree present.

2. The presence of astigmatism complicates the problem the "axis of the astigmatism" can usually be determined with-

out a mydriatic, the amount will be found to vary at each trial, and there is nothing to indicate which is the true result.

3. In regular mixed astigmatism the sources of error in both H. and M. cöexist.

4. Hence use of a mydriatic in the case of every patient under 50 or 60 should be "a hard and fast rule" only to be departed from when the circumstances of the patient absolutely forbid his submitting to the inconveniences entailed by the use of the drug: then it should be explained to him that the determination is only approximative, and the glasses prescribed merely a temporary resource.

Now what can be the reason that the greater number of oculists continue, and I have no doubt will for years continue to dispense with the use of mydriatics?

It is true that their employment subjects the patient to great discomfort and some loss of time, and for these reasons many persons will object to the use of these drugs, and the practitioner may fear by insisting upon the necessity for them to drive a possible client into other hands. But apart from the fact that a yielding to these considerations would be, in my opinion, a sadly short sighted policy, I cannot believe that the members of our profession would be moved by them to abandon an exact diagnostic method and take to one that offers but a shifting measure of certainty. No, the cause lies in the prevalent, but I am convinced mistaken, ideas as to the strength of the glass which should be prescribed for the correction of the various anomalies of refraction.

The whole error of refraction revealed by the mydriatic should be corrected.

We know that the emmetropic eye is able to meet all demands upon it without discomfort, for the happy possessors of such eyes are rarely to be found among the visitors to our consultation rooms, aud the majority of civilized men on the sunny side of forty are still able to dispense with spectacles. It would seem the most natural thing, therefore, having found an eye ametropic to remove the disability by means of a lens exactly compensating for the refractive error revealed by the mydriatic.

In practice, however, we find, that the eye having recovered from the effects of the drug is no longer able to see perfectly through such a glass. In hypermetropia the glass must be reduced from 1 to 2 D. and the greater number of practitioners hold, apparently, that it is this weaker glass which should be prescribed, the reason assigned being that this amount of positive refraction will be added to the total error found when, as the effect of the mydriatic passes away, the ciliary muscle recovers its normal tone or tension. I believe this "ciliary tension" to which our confrères have pinned their faith, to be entirely a phantom of the imagination. In the first place the *power* of tension ascribed to the muscle is manifestly absurd. According to Landolt, the total accommodative power possessed by a child of ten is represented by a glass of +14 D., and if we subtract from the glass representing the Ht. in any case 1 or 2 D. we are committing ourselves to the supposition, that the tone or tension of this microscopical muscle is equal to from $^1/_{14}$ to $^1/_7$ of its total power. No one would contend suppose that a biceps capable of lifting a load of 14 pounds, would, if 1 pound were placed in the hand and all the opposing muscles cut, jerk that weight to the shoulder by the force of normal muscular tension alone. Indeed the doctrine of "muscle tonus" has been utterly abandoned by physiologists (Landois and Sterling; Second Edition, p. 667.) But aside from all speculation there are two facts which positively demonstrate the non-existence of this ciliary tone. We occasionally see patients whose refraction, even when the muscle is entirely paralyzed by the action of a mydriatic, is perfectly emmetropic, vision being $^{20}/_{20}$ or $^{20}/_{15}$. (Cases 7, 12); and these same patients remain emmetropic, when the ciliary muscle untrammeled by mydriatic influence, is free to exert upon the refraction, the effect of its tension. Did this in truth equal a glass of +1, or even of +0.50 D., the eye which had proved emmetropic under a mydriatic would have become myopic and a glass of —1 or —0.50 D. would be required to raise vision to the normal. For if a glass of + 0.50 D. be held before a perfectly normal eye

(uninfluenced by a mydriatic) it is no longer able to distinguish even $^{20}/_{30}$, as I know from my own experience.

And this brings me to the second fact. I do not mean to assert in what I have just said, that I am blessed with the possesion of emmetropic eyes; but I have worn for years (at first constantly and now for all near work) glasses which correct my total hypermetropia as determined after repeated instillations of atropia, and while these at first blurred my distant vision greatly, I can now read through them $^{20}/_{12}$ quite clearly: they render me emmetropic. Did the ciliary muscle exert a tension force of 1+or+0.50 D. this would be impossible. The addition of the weaker of such lenses to my glasses at once reduces my vision to $^{20}/_{50}$. I have seen scores of persons who presented the same phenomenon: (Cases Nos. 13, 14, 15, 16, 17, 4, 6, 10).

In myopia the conditions are the opposite of those we have been considering; glasses are not as a rule prescribed for the relief of asthenopia and pain, but to procure good distant vision, and to check the progress of the malady, the latter being the most important indication. Swanzy consistently teaches, that to the glass which corrects the total myopia—0.50 D. should be added to compensate for the ciliary tone, but we believe we have said enough to show that this is an imaginary quantity. The generality of practitioners, however, advise the reduction of the glass determined under a mydriatic by 1 or more D., though the glass so determined is itself usually weaker by this amount than the glass found when no mydriatic is used.

Now there are two main thories concerning the tendency to the progressive increase of myopia. Both presupposing an inherent weakness of the ocular coats, the first regards the exciting cause as intra-ocular, the constant pull of the ciliary muscle. Founding themselves upon the observations of Iwanoff and Rollet, some have contended, that the great development of the longitudinal fibres of the ciliary muscle found in myopic eyes, is due to the incessant efforts made while regarding distant objects to draw forward the choroid and retina, and thus

lessen in some degree the myopia. If this be true we can hardly make a more fatal mistake than prescribing a glass too weak to correct the total myopia, for by so doing we have active during all the time that far objects are regarded a certain portion of the exciting cause. Others who hold to this theory, believe that the strenuous accommodative efforts necessitated by the constant approximation of small objects to the myopic eye is the injurious factor. Of course less strain is put upon the accommodation in viewing a small object at a moderate distance, let us say 16 inches, through a weak glass than through one which corrects the total myopia; but a weak glass does not force the myope to hold small objects at this moderate distance, on the contrary he is very apt to yield to habit and the desire for larger images and carry the objects to the point at which he was wont to regard them without glasses, and if this happens the glass renders necessary an accommodative effort greater than before. On the other hand the ciliary muscle not being very highly developed in myopes, a glass which corrects the total error will usually compel the holding of the object at a reasonable distance, under penalty of blurred vision and more or less discomfort and pain.

The second theory, and the one which to-day seems to be gathering about it the greater number of adherents, holds that the pressure of the recti muscles upon the globes in all movements of convergence is the exciting cause of myopia and its increase. If we accept this view, then, as has been lately pointed out by Foerster, *the* object of a glass is to enable, to force the myope to keep all near work at a reasonable distance, and a strong glass, one which corrects the total error, best fulfils this indication for the reason just given above. Granting the soundness of this reasoning, whichever theory we adopt, the glass which militates most strongly against the causes of increase is that which fully corrects the total myopia; for the two factors accommodation and convergence act and react unceasingly, and the glass which does away with all accommodative effort in distant vision must give to the internal recti long periods of complete rest, while by compelling the holding of

near work at a reasonable distance, it relieves at one and the same time the recti and the ciliary muscles. And these conclusions seem to be borne out by the results of practice, case No. 18 affording a conspicuous example.

Beyond a doubt that myope is most fortunate whose defect is discovered early in life, accurately determined under a mydriatic, and fully corrected by the glass so found. I know many whose fully correcting glasses are as constantly worn as their clothes, who are emmetropic to all intents and purposes, being utterly unconscious of their eyes and enjoying perfect or even extraordinary vision at all distances. And these happy results may be obtained in persons past the age of thirty, though they never before used glasess, but previous use of even a weak and imperfect glass makes them easier of attainment.

The difficulties with which we have to contend in prescribing the full correction of hypermetropic and myopic defects are inveterate habit, and a lack of perseverance on the part of our patients, and perhaps ourselves. The hypermetrope has been used to accommodate constantly even when regarding the most distant objects, and when first provided with correcting glasses he continues to do so, rendering himself practically and very unpleasantly, nearsighted. Thus, though he finds the glasses agreeable and satisfactory for near work, they are almost intolerable for street wear, and it requires great tact and trouble to persuade our patient not to abandon them before the end of the six weeks or three months required to learn to relax his accommodation in looking at distant objects. Happily in a large number of cases of hypermetropia the use of glasses for near work is all that is necessary.

In myopia the habits of seeing very indistinctly even moderately distant objects, and of approaching all small objects very near to the eye and so enjoying large images, have to be overcome. The myope upon first putting on a pair of glasses which correct his total myopia, experiences a very unpleasant sense of dazzling and strain; the relative positions of objects seem changed, going up and down stairs and stepping across

gutters, etc., are especially difficult; he sees too well, the eyes are required to triangulate exactly and they do not know how. In near work matters are still worse; at first these strong glasses soon bring on accommodative asthenopia, and reading which could be formerly indulged in to an unlimited extent, has now to be restricted to spells of fifteen or twenty minutes. Yet all these difficulties can be overcome, and once overcome I believe our patient is placed in a far better position than if he had been made the victim of multitudinous pairs of spectacles (cases 5 and 18); for by a simple mechanism he is rendered emmetropic, and having developed his ciliary muscle at an expense of time and trouble, small in comparison to that devoted by many to the development of a biceps entirely ornamental under the present constitution of society, he is not only able to enjoy all the comforts of that happy state, but to guard against the increase of a serious evil.

Convinced of the principles I have contended for in this paper, it becomes our duty to insist upon the necessity of using a mydriatic in every case of refractive error in a person under fifty, and to spare no pains to persuade our patients to adopt the use of a glass correcting the total error thus determined.

The first rule, I believe, admits of no exception, for as I have said, without a mydriatic an element of doubt must lurk in our results, and an intelligent optician will achieve, in most cases all that we can accomplish. It is in vain save, in exceptional instances, to hope for an opportunity of re-examination, *if the mydriatic has not been used*, for few patients who have become possessors of an unsatisfactory pair of glasses at a cost of but little time and inconvenience, will return to the same practitioner in the hope of receiving a better.

But once the formula found under the mydriatic is registered in our book, we are masters of the situation. If it becomes necessary, we can modify in a reasonable and definite manner the glass which has proved unsatisfactory: we have a fixed quantity to work from. The patient too, who has undergone all the discomfort of an examination under a mydriatic, is not apt lightly to abandon the result; he will return for a slight

modification of his glass which holds out hopes of increased comfort, and which, it has been explained, can be made with but little loss of time and at no inconvenience.

But the second rule cannot be laid down "hard and fast". There are some hypermetropes,especially the victims of a high degree, who can never learn to relax the accommodation sufficiently to wear with comfort fully correcting glasses for distant vision, and certain myopes, more particularly those who begin the use of glasses late in life, must be provided with a weaker glass for near work; occasionally even they are unable to use for distant vision a fully correcting glass, and we are forced to reduce its strength to a comfort-giving degree.

I had hoped to extend this paper to show that the slight forms of astigmatism, one quarter of a dioptric, often cause as much annoyance as do the higher grades, and, that these equally demand correction by cylinders, but upon looking over my case book I found, that I could not bring forward enough evidence to give any strength to the proposition. This, however, is my conviction, and in all ametropes who have much near work to do, it is my habit to determine and correct these slight degrees of astigmatism as exactly as possible. The error in my own eye is +0.50 s ⌒+0.50 c ax. 90°, and the presence or absence of the cylinder makes a great difference in the comfort with which I read; with the cylinder print appears much blacker and clearer than without.

Finally, a settlement of these questions is devoutly to be wished for, and a full and free discussion of them should go far toward that end. Medicine can never be an exact science; even into such a question as this, individuality, the expression of the immutable law of variation, enters, and at the last moment gives a new and unexpected result to our calculations; but by the collection and analysis of a vast number of cases, it should be possible to establish working rules, to which in certain cases a man of common sense would be able to make exceptions. Thus it would be brought within the power of an ordinary intelligence, quickly, safely and certainly to remove what is to-day a great and ever increasing barrier to the hap-

piness and even the success of thousands in the stern struggle for existence.

Illustrative Cases on the use of Mydriatics in Determining Refraction, etc.

Case I.—March 31, 1887. Miss——, æt. about 20, has for several years suffered at times from blepharitis and symptoms of accommodative asthenopia.

About two years ago she consulted one of New York's most distinguished oculists. He told her at once, that she was probably hypermetropic, but after a careful examination—without a mydriatic—with the test glasses and the ophthalmoscope, said he had been mistaken. I instilled an eight grains to the ounce solution of atropia, and found with the test glasses +1. s ⌒ +0.25c ax. 90° D., each eye. The use of these glasses for all near work together with a little of Pagenstecher's ointment on the edges of the lids soon effected a permanent cure of the blepharitis, and she can read as long as she pleases without symptoms of asthenopia.

Case II.—February 21, 1887. A young clerk, for whom an excellent oculist had prescribed $+^{1}/_{48}$s. Notwithstanding that he wore these he suffered greatly with all the symptoms of accommodative asthenopia. Examination under atropia with the test glasses revealed +1.50 s ⌒ +0.50 c ax. 90° D. each eye.

Case III.—October 5, 1883. A student of law, æt. 25, consulted me in October, 1883. For more than a year his eyes had been sensitive to light, and painful, and a cloud seems to come between him and the book when he is reading. A practitioner of reputation whom he consulted gave him a pair of $+^{1}/_{48}$ s, and these not affording relief, kept his eyes under the influence of atropia, giving him a pair of $+^{1}/_{10}$ s for near work—result an attack of intense neuralgia. Then consulted a distinguished specialist, who said that the retinæ were congested, and prescribed $+^{1}/_{60}$ s for near work and an "eye-wash". After some use the eyes again became troublesome, and the

same gentleman recommended six months rest, pilocarpin and pills of strychnia, quinine and iron. The patient was unable to follow the advice as far as taking the rest. Eight months later he consulted me complaining of the old symptoms, which were seriously interfering with his studies. His conjunctivæ were congested and Hm.=0.75 D. Examination after repeated instillations of atropia, revealed: R.+0.50 s; L.+0.50 s ⌒+0.25 c ax. 90°: with these he was enabled to continue his studies. He has since become a busy lawyer. I heard from him Sept. 1886; he uses his glasses for all near work and his eyes never give him any trouble.

Case IV.—Dec. 27, 1884. X, æt. 24, was educated as a lawyer, but is now teaching school, as his eyes do not permit of his pursuing his former profession. His general health is excellent, but about four years ago he studied much by artificial light and his eyes became troublesome and have been so ever since. About a year ago he began active practice, when his eyes broke down entirely. He consulted a prominent southern oculist, who, without using a mydriatic, prescribed compound glasses. These never gave the slightest relief. Under atropia the error was found to be +0.50s⌒+1c ax 90° D. each eye. These afforded marked but not entire relief, and subsequent examination discovered an insufficiency of each internal rectus of 1°. He wears the lenses combined with the prisms constantly, and his eyes are perfectly comfortable. Now (1888) the prisms require some change, V. (with glasses) $=^{20}/_{20}$ each eye, but with a pair of +1 s D. over these glasses V. is reduced to $^{20}/_{70}$.

Case V.—Feb. 1887. Miss ——, æt. about 18, general health excellent. Her eyes become red and painful if they are used for any length of time. She has had glasses prescribed by two well-known oculists, the last of whom gave her a pair for distance, a pair for piano playing and a pair for reading. The distance glasses were R.—4.50s—⌒1.25c ax 15°; L.—5s⌒—0.75 c ax 90° D. There is no insufficiency of the recti manifest at 20 feet. By Graefe's test at 14 inches she requires a prism of 5°, base in. She is kept under atropia four days; now there is no insufficiency with Graefe's test, and the refraction is, R—7s

⌒—1c ax 15° (V.=$^{20}/_{20}$ a few letters); L.—6s⌒—2c ax 15° (V. =$^{20}/_{20}$). After a prolonged use of atropia, the eyes are allowed to come from under its influence when an insufficiency of each internal rectus of 2° is found. The fully correcting lenses combined with these prisms, bases in, prove after a few days wear very satisfactory for distant vision and for playing the piano, but she can only read for a few minutes at a time. This fall (1887) she was still unable to read for more than a few minutes at a time with these glasses.

Case VI.—Jan. 22, 1886. Merchant, æt. about 28, general health excellent. Complains of the symptoms of accomodative asthenopia. V. R.=$^{20}/_{15}$; L.=$^{20}/_{12}$. Reads $^{20}/_{20}$ through +1 s D. He tries a pair of +1s D. for reading for two weeks, and the glass for the left eye seems to suit, but not that for the right. Under atropia the error is found to be, R.+0.50s⌒+ 0.50c ax 90°; L.+1s D. V. with these is barely $^{20}/_{20}$ each eye. In the street vision seems "misty." At the end of six months V. (with glasses) R. and L.=$^{20}/_{12}$ well, $^{20}/_{10}$ a few letters.

Case VII.—Miss ——, æt. 45, general health excellent. Has not been able to use her eyes for near work, especially by artificial light, for some time with any comfort. She has never worn glasses. V. R. and L.=$^{20}/_{20}$ easily. There is no insufficiency of any muscle at any distance with any test, but she can only overcome a prism of 5° with either internal rectus, and a prism of 3° with either external rectus at 20 feet. No trouble with Graefe's test at 14 inches. A strong solution of atropia is instilled daily for one month, but still V. R. and L.= $^{20}/_{20}$. At 20 feet each eye overcomes prism of 10° base out and a prism of 4° base in. The same solution is used daily for about a month longer when the eyes are allowed to regain their natural condition. V.=$^{20}/_{20}$, and at 20′ each eye overcomes a prism of 20° base out. Suitable glasses for near work render the patient comfortable.

Case VIII.—Miss ——, æt. 13. V. R.=$^{20}/_{20}$; L.=$^{20}/_{20}$, not quite so well. At 20 feet she requires a prism 2° base in before L.E., and the same prism at 14 to 5 inches. Pencil point carried to within 5 inches is seen double and left eye deviates

outwards, but either eye, if covered deviates. Patient is kept under atropia three days when V. R.=$^{20}/_{50}$+1s=$^{20}/_{20}$; L.=$^{20}/_{40}$. +1s=$^{20}/_{20}$, scarcely any insufficiency. Order these glasses decentred so as to act as weak prisms bases in. Two months later, patient is asthenopic again. Now requires a prism of 4° before one or the other eye at all distances. A strong solution of atropia is instilled three times daily for a month, when a prism of 2° is required before either (one or the other) eye for all distances. These with the lenses render the patient perfectly comfortable.

Case IX.—May 12, 1887. Miss ——, æt. about 24, pale and thin with a family history of phthisis. Has always been subject to styes and blepharitis. Lately she has had 10 or 15 large and painful styes in quick succession, and has now another coming on the left lower eye-lid. As she has Hm.=0.50 s, and symptoms of accommodative asthenopia, a strong solution of atropia is instilled on four successive days. The stye, as I had felt warranted in promising, never "came to a head" but disappeared, causing little or no pain. There was no other treatment.

Case X.—March 8, 1887. Mr. ——, æt. 24, book-keeper, robust health. Several members of his family are near-sighted. His eyes are sensitive to light and uncomfortable when he is doing near work, especially by artificial light. V. R. and L.=$^{20}/_{30}$ poorly. Manifest M.=0.50s. The disc and retina much congested. Solution of atropia instilled three times daily for 6 days, when refraction found to be +0.50s⌒+0.50c ax 90° each eye. With glasses V.=$^{20}/_{20}$ each eye. He wears glasses constantly and has no further trouble with his eyes.

Case XI.—Jan. 1887. Miss——, æt. 15, school girl, beautiful, thin, delicate skin and long eyelashes. A slight tendency to blepharitis. The conjunctivæ are a little congested. Eyes water and smart when she uses them long for near work, especially by artificial light. At 14 inches there is an insufficiency of 2° of each internal rectus. V. R. and L. one or two letters of $^{20}/_{20}$; —0.50s improves. After two instillations of atropia V=$^{20}/_{20}$, one or two letters; with —0.25 c ax 180°=$^{20}/_{20}$ well; L.V.=$^{20}/_{20}$

—0.50 c ax 180°=$^{20}/_{20}$ well. Eyes kept under influence of atropia for two weeks, when V. R. and L.=$^{20}/_{15}$ some letters; insufficiency of internal recti has disappeared. She has no further trouble; June 1888.

Case XII.—Feb. 4, 1887. Miss ——, æt. 18. Consults me on account of a divergent squint. V.=$^{20}/_{20}$ well; $^{20}/_{15}$ one or two letters; no Hm. After using a strong solution of atropia morning and night for four days, V.=$^{20}/_{20}$ well each eye. With +0.50 c ax 90° V.=$^{20}/_{15}$ fluently each eye.

Case XIII.—April 14, 1884. A physician, æt. 33, also is troubled by muscæ and accommodative asthenopia. After the use of atropia the refraction was +0.75s⌒+0.50 c ax 90° each eye. After a week's use V. with the glasses =$^{20}/_{20}$, and he used them with comfort to the day of his death, Feb. 12, 1887.

Case XIV.—April 14, 1885. School boy, æt. 14, suffering from accommodative and muscular asthenopia. Hm.=1D. Refraction under atropia =+1.50 s. Requires prisms of 1½° bases in for all distances. Two years later, having become a clerk his eyes grew troublesome, and I advised the constant use of the glass which he had hitherto used for near work only. After a week or so eyes were perfectly comfortable and V.=$^{20}/_{20}$ each eye.

Case XV.—Feb. 23, 1884. A collegian, æt. 17, whose eyes broke down about a year ago. V. at that time =$^{20}/_{20}$ some letters. Examination under atropia gave the formula +1s⌒0.50 c ax 90° ⌒ prism 1½° base in, each eye. A year after the eyes again became troublesome, and I ordered the constant use of the glasses. After a short struggle, V. (with glass) =$^{20}/_{20}$ well, each eye.

Case XVI.—Lawyer, æt. about 32. Eyes irritable after reading a while, especially by artificial light. V=$^{20}/_{30}$ poorly, each eye. Hm.=1 D. Error determined after free use of atropia, +0.50 s.⌒+1 c. ax. 90°. After wearing two or three weeks V (with glasses)=$^{20}/_{12}$ some letters.

Case XVII.—Sept. 15, 1885. Collector, æt. about 25. Accommodative asthenopia and divergent squint of left eye. Hm.=1 D. Under atropia refraction 0. 75 s. each eye. After a year's use V (with glass)=$^{20}/_{20}$ well, each eye.

Case XVIII.—Feb. 4, 1887. Mrs.—, æt. about 24. Her mother is very myopic. R. V.=$^{20}/_{200}$, L. $^{10}/_{200}$. She has light hair and eyes and a very languid manner. The eyes appear normal save a slight divergent squint in the left. The opthalmoscope reveals nothing that I can call abnormal, but the whole choroidal circulation is much too plainly visible. She had had the services of several oculists who gave her glasses, without, however, using a mydriatic, but none were of any service. A strong solution of atropia is instilled morning and night for a week, when five determinations give the error as, R.—2 s.⌒—3 c. ax. 180°; L.—6s.⌒—3 c. ax. 180. She is kept under the influence of the atropia twenty days longer, when she is able to fuse images at 20 feet with a prism of 3° base in before the left eye, a feat which no prism enabled her to perform when I first saw her. The atropia is now discontinued, and two weeks later, with the lenses combined with prisms of 2° bases in V=$^{20}/_{20}$ some letters, each eye; De Wecker No. 1, and no insufficiency can be made out June, 1888. Wears glasses constantly and is very comfortable.

Addendum—June, 1888.

Case I.—Proving that normal vision can be had through full correction with plus glasses and that the addition of low plus glasses to this correction blurs vision; in other words that the normal *tone* of ciliary muscle has no existence in fact.

June 20, 1887. P. B. æt. 13. Symptoms of accommodative muscular asthenopia. V. R. and L.=$^{20}/_{20}$ poorly. Hm.=0.50 s. D. Under atropia R.V.=$^{20}/_{30}$,+0.50 s.⌒+0.50 c. ax. 165°=$^{20}/_{20}$. L. V.=$^{20}/_{30}$,+0.50 s. ⌒+0.50 c. ax. 15°=$^{20}/_{20}$. March 3, 1888. Without a mydriatic and with the above correction, V. R. and L.=$^{20}/_{20}$ well. When a +0.25 s is put before the glass on either eye V.=$^{20}/_{30}$, and +0.50 s reduces it to $^{20}/_{40}$.

Case II.—Corroborates case I. June 27, 1887. Miss M. C., æt. about 20. Has worn plus glasses for some years, but does not think they suit her exactly. R. and L. V.=$^{20}/_{30}$. Hm.=0.50 s. D. and raises V. to $^{20}/_{20}$, a few letters. Under atropia,

R. V.=$^{20}/_{100}$+3 s.⌒+0.50 c. ax. 60°, V.=$^{20}/_{20}$, some letters. L. V.=$^{20}/_{100}$+3.50 s.=$^{20}/_{20}$ some letters.

After some weeks, the effects of the atropia having entirely passed away with the above correction R. and L.=$^{20}/_{15}$.

June 2, 1888. She wears her glasses almost constantly and finds them a great comfort.

Case III.—Corroborates cases I. and II. Sept. 19, 1887. G. W. B., æt. 23. Symptoms of accommodative asthenopia. Hm. =0.50 s. D. R. V. with atropia=$^{20}/_{40}$; with +0.50 s⌒+0.50 c ax. 90°=$^{20}/_{15}$. L. injured in early youth.

Oct. 6, 1888. All effects of the mydriatic entirely gone. R. V. with above full correction=$^{20}/_{20}$.

Case IV.—A very careful examination before the use of the mydriatic determines accurately the formula for the R. E., but allows an error of 1 D. in that for the L. E. which would never have been detected but for the subsequent use of atropia.

Jany. 26, 1888. F. K., æt. 18. Had an inflammation of the eyes, ascribed to cold, at 5 years of age, and ever since his sight has been poor, but he thinks he sees better now than 5 years ago. Father and mother both myopic. Small light nubeculæ on each cornea.

V. R. =$^{20}/_{200}$;—5 s ⌒—2 c ax. 135°=$^{20}/_{50}$.

V. L. =$^{4}/_{200}$;— 5 s ⌒—3 c ax. 180°=$^{20}/_{70}$.

Jany. 28. After 3 instillations of the strong solution of atropia on 3 successive days.

R. V. =$^{20}/_{200}$;—5 s ⌒—2 c ax. 135°=$^{20}/_{50}$.

L. V. =$^{4}/_{200}$;—4 s ⌒—3 c ax. 180°=$^{20}/_{70}$.

June 6, 1888. Have heard from him recently, and the glasses give great satisfaction.

Case V. Corroborates case I. Jan'y 31, 1888. Miss P. æt. about 22. Accommodative asthenopia. R. and L. V.=$^{20}/_{20}$ a few letters. Hm.=0.50° c ax. 180° each eye. Feby. 9, 1888. Under atropia, R. and L. V.=$^{20}/_{50}$;+ 1 s, each eye=$^{20}/_{20}$; both eyes=$^{20}/_{15}$ some letters.

April 11, 1888. All traces of the mydriatic influence long since passed away; V, both eyes with glasses, =$^{20}/_{15}$.

Case VI.—Shows the danger of overcorrection in myopia, even when great care is taken, if no mydriatic is used.

Feb. 15, 1888. Miss X. æt. about 25 years. Myopic. Was "refracted" by a most competent oculist who gave—5 s each eye, without atropia. Before the use of the drug a most careful examination on my part gave :

R. V.=$^{5}/_{200}$,—7 s⌒—1 c ax. 180°=$^{20}/_{20}$.

L. V.=$^{5}/_{200}$,—7 s=$^{20}/_{20}$.

After the use of the mydriatic on three successive days I found

R.—6 s⌒—0.50 c ax. 180°=$^{20}/_{20}$ some letters.

L.—6 s⌒—0.25 c ax. 180°=$^{20}/_{40}$ " "

I have heard (June, 1888) lately that these glasses give perfect satisfaction; the—5. s did not. My confrère fearing to overcorrect had undoubtedly cut his result down too low, and not recognizing the presence of astigmatism, or regarding it as too slight to be of consequence, had failed to correct it.

Case VII.—Demonstrating the great difficulty of determining a low degree of M., with the ophthalmoscope and with the test glasses without the use of atropia.

Feb. 25, 1888. Miss B. W. æt. about 20. Eyes burn and get red and dim when studying. V. R. and L.=$^{20}/_{50}$ Mm.=1 s D. Ophthalmoscopic examination shows a normal fundus and H. 1. s D (?) Order an eight grains to the ounce solution of atropia to be instilled night and morning.

Feb. 26. Pupils fully dilated. R. and L. V.=$^{20}/_{70}$ M.=1 s or 1.50 s D. With the ophthalmoscope I can get *a virtual image of the fundus*, which moves in the same direction as my head, at 3 or 4 inches from her eye. I can see many details quite clearly with+1. s D., though—2 s seems to give the *clearest* view. Apply atropia and direct a continuance of its use night and morning.

Feb. 28. Pupils fully dilated. V. R. and L.=$^{20}/_{40}$ R.—0.50 s ⌒—0.50 c ax. 60°=$^{20}/_{20}$ a few letters. L.—0.50 s ⌒—0.50 c ax. 120°=$^{20}/_{20}$ a few letters.

Case VIII.—March 7, 1888. E. G. B. æt. about 36. Although his eyes have always been good and strong they are

growing a little dim of late for reading at night. He thinks he is rather nearsighted.

R. V.=$^{20}/_{50}$,—2 c ax. 180°=$^{20}/_{30}$.

L. V.=$^{20}/_{40}$,—0.75 c ax. 180°=$^{20}/_{20}$ a few letters.

These glasses improve near vision and enable him to read DeWecker No. 1, the print looking clearer and blacker. Every plus glass even+0.25 s is peremptorily rejected. I can get a virtual image of the fundus at about 3 inches, but any plus glass blurs.

March 9. Atropia has been instilled in R. E. three times on as many consecutive days. V=$^{20}/_{200}$,+1.50 s⌒+2.50 c ax. 100° =$^{20}/_{20}$. L. E. in which the mydriatic has *not* been used still sees best with—0.75 c ax. 180° which gives $^{20}/_{20}$ well. Even+ 0.25 s is still rejected. With the ophthalmoscope I cannot see the fundus at all with more than+1. s D., or further (with no glass) than two inches from the eye, which, together with the manifest M. of 0.75 s and the absolute rejection of even+0.25 s would indicate a low myopia. In the right eye, which is under the influence of the mydriatic, I can run the plus glasses (behind the ophthalmoscope) up to 3 D., in looking at vertical blood vessels, and as I have a hypermetropia of+0.50 s⌒+0.50 c ax. 90°, this shows that I am able to suspend my accommodation very fully, for the total H. in the horizontal diameter of the patient's eye is 4 D., hence the inability to use plus glasses behind the ophthalmoscope in viewing the fundus of the left eye must be due to a moderate degree of myopia or to a contraction of the circular fibres of the patient's ciliary muscle.

May 4 and 5, 1888. A strong solution of atropia is instilled in the L. E. V.=$^{20}/_{200}$ and now+1.50 s ⌒+2. c=$^{20}/_{20}$. A clear demonstration of the impossibility of discovering a high degree of latent H. in certain cases. Yet this man was past 35 years of age, and there was nothing especial to indicate the use of atropia. The rule which I am endeavoring to establish alone saved me from committing a grave error.

FUGITIVE ŒDEMA OF EYE-LIDS.

BY G. E. DE SCHWEINITZ, M.D., UNIV. OF PENN.

Ophthalmic Surgeon to the Philadelphia Hospital, to the Children's Hospital; Ophthalmologist to the Infirmary for Nervous Diseases.

Under the above title Tom Robinson, M. D., (*British Medical Journal*, May 12, 1888—See this number, page 175) briefly records the case of a woman, æt. 46, the subject of stomach trouble and headache, who had a marked swelling of the eyelids, which kept coming and going, generally lasted two or three days, and returned when she got another headache. In his remarks Dr. Robinson says: "Such cases are not uncommon. We often find those who are the victims of periodical headaches present a condition of fugitive œdema of the eyelids. We also find many women during the menopause who have localized swellings of the hands and arms—swellings which are tender, pit on pressure, are preceded by pain, but pass away after a few hours of exercise."

Recently a very typical case of this character has occurred in the practice of the writer. The patient, an unmarried woman, was seen in consultation with Dr. Chas. K. Mills. She was engaged in active literary pursuits, and was subject to periodical headaches which usually appeared once in every ten days or two weeks. Twelve years ago she had an unusually severe attack of typhoid fever, and since that time has had a number of spells of severe catarrhal jaundice. She is at present typically a patient "with a liver." There is no uterine or renal disease. Recently after a severe head pain, lasting for three days, and located chiefly in the distribution of the right supra-orbital nerve, œdema of the right eye-lids and the right half of the forehead appeared. This was accompanied by a

throbbing sensation at the upper and inner angle of the eye. In the right eye the refraction error, measured under atropia, is +0.5cc axis 105°; the left eye is emmetropic. There are no errors in the muscular balance, and the fundus of each eye is normal. Under the local use of hot stupes and the internal administration of Basham's mixture, this œdema subsided in a few days. No return of the trouble appeared for three weeks, when, after a day's pain, the swelling was again manifested. The patient was now put upon iodide of potash and salicylate of soda, and a small fly-blister placed above the eyebrow over the course of the supra-orbital nerve. The swelling and pain again subsided and no recurrence took place until ten days later when it reappeared, but this time without any preceding pain. Since then there have been several severe pain periods unaccompanied by any œdema.

Remarks.—The pathology of this affection is not very clear. Naturally the existence of a neuritis of the supra-orbital nerve was discussed. Many points, however, militate against the acceptance of this theory. The pain was less violent than that which accompanies neuritis. There was no association with a rheumatic history in the past or with a general disorder in the present, nor was there any evidence of undue exposure. More than this there was no persistent tenderness over the course of the nerve, nor pain upon pressure over Valleix's points, the supra-orbital foramen, the palpebral points, the nasal or the inner angle of the eye. A thorough examination of the teeth by a competent dentist failed, in his opinion, to reveal any dental trouble that might have caused this affection. The fugitive, come and go character of the disorder, precluded the possibility of this being an œdema due to venous thrombosis. It is perhaps interesting in this connection to refer to that remarkable disorder, named by Quincke angio-neurotic œdema, which is characterized by the sudden appearance of œdematous swellings in various regions and of temporary duration. This disease and especially its hereditary character in certain

cases, has recently been discussed by Osler[1] who declined, in the present state of our knowledge to enter into a theoretical discussion on nervous œdema. Quincke regarded the disease as a vaso-motor neurosis. The present disorder does not, of course, belong to the cases which have been classed as angio-neurotic œdema, but it seems not improbable that the swelling may depend upon a disturbance of the vaso-motor influence which permits an increase in the permeability of the vessels and results in this fugitive œdema. It is finally, perhaps, not unworthy of remark that the region of œdema was around that eye, the refraction of which was a slight simple hypermetropic astigmatism. No distinct relation between this and the pain or the swelling, however, could be demonstrated.

[1]Hereditary Angio-Neurotic Œdema. By W. Osler, M. D., *Amer. Jour. Med. Science*, April, 1888.

A CASE OF OSTEO-FIBRO-LIPOMA OF THE CONJUNCTIVA.

BY J. S. PROUT, M. D. BROOKLYN, N. Y.

MICROSCOPICAL REPORT BY RICHMOND LENNOX, M.D., BROOKLYN.

Cases of this character are very rare. I find reference to only five, as follows:

Two in the Graefe-Saemisch Handbuch, IV, 1, 151, one of which was removed by A. von Graefe, the other by Saemisch; one by the late E. G. Loring. reported in the Trans. Am. Oph. Society, Vol. III, p. 437, meeting of 1882, (also reported in the *N. Y. Med. Jour.*, 1883, XXXVII, 12); one by A. Critchett in Trans, Oph. Society of the United Kingdom, Vol. II, 1882, p. 254, and one by Simeon Snell in the Transactions of the same society, Vol. IV, 1884, p. 31. To these I am able to add the following case:

Mrs. H. G., æt. 28, consulted me on March 17, 1887. She said that when she was born there was a small tumor under the outer part of the upper eyelid, which came into view when the eye was turned to the inner side. Formerly a hair grew out of it. It gradually became less conspicuous, but since her marriage, at the age of twenty, it had grown larger, being especially prominent at the time of each confinement, of which she has had four.

When the eye is closed the growth can be felt as a flat, freely movable body under the eyelid, retreating on pressure under the upper outer margin of the orbit. When the eye is open the lower edge of the growth appears under the upper lid at its outer third. On drawing up and partially everting the lid the tumor comes almost fully into view, is freely movable, feels firm and elastic, and measures about 12 × 18 mm. The conjunctiva is apparently not adherent to it, but seems slightly thickened and is a little injected. It annoyed her by its pressure on the eyeball but caused no pain. She complains of floating bodies. V=$^{18}/_{XXV}$—each eye. The ophthal-

moscope showed no floating bodies nor anything wrong in either eye.

No positive diagnosis was made. From the fact that a hair had formerly grown from it I thought it might possibly be a cystic tumor.

On April 11, assisted by Dr. C. E. Gunther, I instilled 2% solution cocaine muriate and dissected out the growth, which extended well up and out under the upper lid. It was of the consistency of and felt like a fatty tumor, about 12×16×3 mm., with a hard centre which was apparently bone or cartilage. The eye was closed by a bandage and the wound left to itself. Healing was prompt. A week later when she looked to the right side there was diplopia. At the end of twelve months this had disappeared, there was free motion in all directions, but she still complained of seeing floating bodies.

Dr. Richmond Lennox very kindly examined the tumor for me. His report is as follows:

The specimen which was hardened in Müller's fluid and alcohol, was found to measure 18×12×4 mm. On section it was seen to consist chiefly of fat in which were numerous bands of fibrillar connective tissue. One of its surfaces was quite smooth and covered in part by epithelium lying upon a fibrous substratum fairly rich in cells and blood-vessels. The epithelium presented nothing unusual save that it was, perhaps, somewhat thinner than is ordinarily the case. Near the center of the tumor there was a hard mass of darker color than the rest, of about the size and shape of a very small bean, (2×3×4 mm.,) which could be satisfactorily cut only after it had been softened for several weeks in dilute chromic acid. It was then found to consist of fully formed bone with an irregularly arranged system of Haversian canals and lacunæ. The osseous tissue was sharply defined, and surrounded by a fibrous capsule, from which it could be shelled out without difficulty. Outside of this capsule the fibrous tissue gradually gave place to the fatty tissue which made up the body of the growth.

Richmond Lennox.

FUGITIVE ŒDEMA OF THE EYELIDS.

From the British Medical Journal.

A sister of mercy consulted me on March 1st of this year. Her history was that she had not menstruated for four months. (She was 46 years old.) She had been subject all her life to stomach and head troubles, and she had had many attacks of erysipelas of the face and head; the last attack of erysipelas was six years ago. She had always had a puffiness of the face, often the headache. Her friends often used to say: "Havn't you a touch of erysipelas? Your face is so swollen." Her present condition began in December, 1887. The swelling of the eyelids was much worse in the morning, and was sometimes so marked that she could not see out of them until she had bathed them and been about for a time. There was a discharge from the eyes at times, which glued the lids together. The swelling kept coming and going; it generally lasted two or three days, and returned when she got another headache.

She was a big-faced woman, with a large, loose frame. Her face and brow were covered by drops of sweat. There was quite a cushion of œdematous tissue overhanging each upper eyelid. There was nothing which would indicate eczema. She was free from any organic disease of the heart or kidneys. The legs were not swollen.

Remarks.—Such cases as the one given above are not uncommon. We often find those who are the victims of periodical headaches present a condition of fugitive œdema of the eyelids. In one instance the swelling was limited to one orbit, and looked as if the man had been stung by a wasp. We also find many women during the menopause who have localized swellings of the hands and arms—swellings which are tender, pit on pressure, are preceded by pain, but pass away after a few hours of exercise.

Tom Robinson, M. D.

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

THURSDAY, MAY 3, 1888.

J. W. HULKE, F.R.S., PRESIDENT IN THE CHAIR.

From the British Medical Journal.

Melanotic Sarcoma.—Mr. C. Higgens gave an account of a case of this affection. The chief point of interest was that the appearance of the growth simulated to such an extent an opaque and displaced lens as to be taken for one by more than one of those who examined it. The eyeball was eventually excised, and found to contain a mass of melanotic sarcoma. The patient died with a greatly enlarged liver seven months after the removal of the eyeball.

A Point in Connection with Artificial Eyes.—Mr. McHardy pointed out that a sinister appearance almost invariably associated with the wearing of an artificial eye was very largely, if not indeed entirely, obviated when such a patient wore spectacles or eyeglasses glazed with odd lenses, so that the lens in front of the artificial eye had something like 3 D. greater refracting power than that before the natural eye. The extra lens power before the artificial eye produced an optical delusion regarding the level and size of the latter; and the excess of lens power, which usually was about 3 D., could be varied according to the distance at which the lens was placed in front of the artificial eye.—Mr. Tweedy thought there was nothing new in the suggestion; he had adopted the practice for many years, and believed he owed the idea to Mr. Lawson.

Primary Tuberculosis of the Choroid.—Mr. McHardy read the notes of a case of local tubercular choroiditis occurring in a child aged 6 years, with negative family history. He closely

watched the intra-ocular condition during four weeks, and then enucleated. The constitutional symptoms which had preceded enucleation immediately subsided after removal of the eye, and had not returned in the five months that had since elapsed. The specimen showed that complete detachment of the retina had occurred at the time of enucleation; that the main intra-ocular tumor was in the choroid, and that the two smaller masses in the retina were all definitely tubercular so far as the microscopical appearances without the presence of bacilli would reveal. He regretted that inoculation had not been practised, urged the importance of early enucleation in analogous cases, and remarked that the literature of the subject pointed to the infrequency of local intra-ocular tuberculosis, to the not invariable, but very usual, failure to find the Koch bacillus therein, and that successful tubercular inoculation from such masses had been affected even when the Koch bacillus had eluded detection.—The President did not remember to have seen a single instance of primary tubercle of the choroid.—Dr. Hill Griffith asked how it was proved that the growth was not a sarcoma? He had enucleated an eyeball for sarcoma, and found a detachment of the retina which was not present immediately before the enucleation. The improvement in the constitutional state might have been the result of the relief from pain.—Dr. Sharkey thought that the diagnosis of primary tuberculosis of the choroid could not be sustained in this case without further history. It was a well recognized fact that tubercular peritonitis was frequently cured, as attested both by clinical and pathological evidence, the latter being extremely strong. It was much more likely that this was a case of tuberculosis of the peritoneum and subsequently of the choroid.—Mr. Carless described the methods of staining adopted in the search for bacilli, and alluded to some points in the clinical history of the abdominal ailment.—Mr. McHardy in reply, pointed out that the appearances did not at all agree with those seen in sarcoma. There was no pain about the eye, but the tumor grew very rapidly, and hence probably the relief of the symptoms after the enucleation.

He quite agreed that there was a doubt as to the nature of the original abdominal affection.

Functional Eye Symptoms in Hysteria and Allied Conditions. Dr. H. Griffith read an abstract of a paper on this subject. He classified the cases into the following groupes: 1. Hysterical blindness, mostly monocular: 2. Amblyopia of one eye, with achromatopsia and hemianæsthesia (Charcot); 3. Same group with absence of hemianæsthesia; 4. Blepharospasm as sole eye symptom. This symptom was common in all the groups; 5. Hysterical conjugate deviation of eyes; 6. Neurasthenic asthenopia, symptoms bilateral. He was in favor of the theory of changes in the centres of vision rather than in the retina, as the cause of contraction of the field of vision.—Mr. Jessop asked if he had met with the concentric spiral cases described by Mr. Priestley Smith, in which it had been shown that a neutral tinted glass enlarged the field. He asked if any change had been noted in the ordinary fields, that is, in relation of green to white, etc.—Mr. Ernest Clarke objected to all the cases being grouped under one heading, some being evidently due to fraud, others to true hysteria, and others possibly were central.—Dr. Griffith agreed that the fields of vision were always affected. He thought it was difficult to draw the line between fraud and self-deception.

On the Removal of Staphyloma of the Cornea.—Mr. Tatham Thompson read a paper recommending that a curved needle threaded with horse hair should be passed through that portion of the staphyloma which it was intended to remove; it afforded a ready means of steadying the eye whilst the elliptical incisions were being made, and of removing the portion after they were completed. The edges of the wound usually adapted themselves readily; the parts were then well flushed with a weak solution of perchloride of mercury, and tolerably firm pressure applied to keep them in apposition. The results obtained were very satisfactory.

INTERNATIONAL CONGRESS OF OPHTHALMOLOGISTS.

Meeting at Heidelberg, August 6 to 12, 1888.

The following papers have been promised:

1. *Knies*: Objective demonstration of color perceptions.
2. *Cohn*; On photographing the fundus oculi.
3. *Cohn*: On myopia.
4. *Manz*: On a teratological subject.
5. *De Wecker*: A new method of treating corneal staphyloma.
6. *Landolt*: On the causes and treatment of strabismus.
7. *Bessel—Hagen*: A case of exostosis eburnea in the orbit.
8. *Kipp*: On keratitis dendritica exulcerans and its relation to malarial poisoning.
9. *Mules*: On lymph-nævi of the eye and its appendages.
10. *Grandclément*: On the good effects of pilocarpine in those badly defined cases, comprised under the name of asthenopia of the retina.
11. *Bernheimer*: On the chiasma nervorum opticorum in man.
12. *Birndale*: The statistics of the refraction of the eye.
13. *Pagenstecher*: On the extraction of cataracts within the lens capsule.
14. *Stilling*: The relation between the shape of the skull and the refraction of the eyes.
15. *Nieden*: Colloid excrescences within the optic nerve.
16. *Knapp*: Designation of the meridian in prescribing cylindrical lenses.
17. *Knapp*: Extraction of cataract without iridectomy.
18. *Singer*: Demonstrations concerning the decussation

of the fibres of the optic nerves in the chiasma.

19. *Grossman*: New method of testing the color-perception.

20. *Zehender*: Two words concerning spectacles.

21. *Hess*: Further communications on the artificial production of dimness of the lens without injury to the lens capsule.

22. *Chibret*: Bacteriological studies made in order to determine an exact antiseptic method in ophthalmic practice.

Further titles of papers are asked for, and may be sent to the committee up to July 31.

ENGRAVING OF THE LATE DR. CORNELIUS R. AGNEW.

At the last meeting of the Ophthalmological and Otological Section of the New York Academy of Medicine, the following motion was made and carried:

"That a committee be appointed, of which the chairman of the section, Dr. David Webster, be a member, whose duty it shall be to obtain a good photograph of the late Dr. Cornelius R. Agnew, for the purpose of having engravings suitable for framing made from this. The right of issue and sale of such engravings shall be given to some first class publisher, if practicable; if not, the committee shall offer them to the profession at cost."

In accordance with the above, a committee has been appointed. Members of the profession who desire such an engraving accompanied by an autograph signature, should send their names and addresses to the secretary of the committee, Dr. Charles H. May, 640 Madison Avenue, New York City, at once. When all such names shall have been recorded, those who have requested a copy of the engraving will be notified of the cost of the same, either by the publisher, or by the committee having the matter in charge.

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PAIN FOLLOWING EVISCERATION MODIFIED BY CAUTERIZING THE INTERIOR OF THE SCLERA WITH CARBOLIC ACID.

BY A. E. PRINCE, M. D., JACKSONVILLE, ILL.

The report, in the May issue of this journal, of the paper of M. Panas on "Enucleation in Panophthalmitis," and its discussion by the French Society of Ophthalmology, prompts the offer of some observations relative to this subject.

From the report of Prof. Alfred Graefe (Halle), 1884, in which he advocates the substitution of evisceration (exenteration) for enucleation, I was led to adopt his conclusions, viz.:

1st. It is less likely to result in the development of septic complications in the brain, or other organs, on account of the remaining sclerotic barrier against the invasion of micro-organisms into the orbital cellular tissue.

2nd. A superior stump is thereby formed for the adaptation of an artificial eye. These advantages are to be weighed against the fact that the pain is greater, inflammation more active, and the period of recovery longer than when the simple enucleation is performed.

My experience in the first five cases of evisceration coin-

cided with that of numerous observers, viz., very considerable pain, requiring opium, and extensive general inflammation, swelling of the lids, and in some, extrusion between the lids, of the œdematous conjunctival folds.

In thinking over the cause of the production of pain, it occurred to me that it was due to the inflammatory irritation and pressure on the ciliary nerves, lying in grooves on the inner surface of the sclera.

Should this be so, it was conceived that they could be effectually anæsthetized by an application of pure carbolic acid, after the removal of the cornea and bulbar contents. In addition to this it was thought that besides the radically antiseptic effect of carbolic acid, a coagulum would be formed by its application which would close the vascular openings through the sclera, and further fortify this barrier against the escape of the microbes into the orbit or sheath of the nerve.

The first case in which it was applied was that of a ciliary injury followed by septic invasion of the vitreous. For three days the patient suffered intensely. On the fourth day the rnea and contents of the eye were removed, and by means of a cotton holder carbolic acid (95 %) was applied to the entire concave surface of the sclera. The eye was dressed moist, with a compress of carbolic acid 1-2 %, and this was changed frequently. Neither pain nor material swelling followed, and the healing was rapid. The patient left the hospital on the fifth day following the operation.

Since that time I have cauterized the sclera in the evisceration of not less than twenty eyes for various conditions, some in advanced suppurative panophthalmitis. Two of my colleagues, Dr. Cullimore, Atchison, Kansas, and Dr. Hargrove, Waverly, Ill., have had additional experience with the same results. The inflammatory process has often been active, resulting in much swelling of the lids, œdema and extrusion of the conjuntiva as before the use of the acid, but in no case has the patient suffered to any extreme degree. In case of swelling, application of compresses of hot carbolic acid 1-2% were applied, but morphia has exceptionally, if ever, been required.

If the happy experience which has fallen to my lot in the use of carbolic acid in evisceration is found to be uniform in the hands of those who have a wider field for observation, much suffering will be saved to the patient, and the principal objection to this operation as urged by Abadie, Meyer, and Panas, will have been removed.

The frequency of death from the migration of septic microbes following enucleation performed during the progress of suppurative panophthalmitis, is so great, that numerous observers have been obliged to report fatal cases.

The safety of evisceration in such cases has been sustained by a large experience, and to my knowledge, no fatal case has been reported.

The increased amount of pain over that following enucleation, which has uniformly been observed by numerous operators, is not to be weighed in the balance against the danger to life which is assumed as acknowledged.

Therefore, should the above observations on the effect of carbolic acid not be sustained by further experience, the argument of increased safety from evisceration must be regarded as no less conclusive against that of enucleation. Should extended experience, however, corroborate these observations regarding the analgesic effect of the carbolic acid, the reduction of the pain, thus accomplished, will remove even this objection to its general adoption.

A CASE OF ASTHENOPIA DUE TO ANÆSTHESIA OF THE RETINA.

BY DR. J. H. STEWART, ST. PAUL, MINN.

The following case is not by any means unique, but invested with more or less interest on account of its perplexing nature, and shows the importance of a thorough clinical history, even in a branch of medicine where the practitioner has the organ to be treated as completely under his observation as though he held it in his hand.

Frank F., aged 29 years, English, machinist, consulted me for the first time March 3, 1888.

About a year ago, when attempting to do fine work, he noticed the image would blur, and after a few moments "go out altogether," as he expressed it.

He had been under the care of a colleague of mine for some three months, who fitted him out with quite an ample supply of eye glasses (some seven pairs in all), none of which benefitted him in the least.

The trouble became more and more annoying; he now had to close his eyes for ten or fifteen minutes at a time in order to reproduce such images as fine lines on steel, letters and print of all kinds.

When his work was concluded for the day he underwent quite severe pain and frontal headache during the greater part of the evening.

His general health was very good, appetite excellent; he slept well; tendon reflex normal; no muscular tremors, and indeed he is quite sound.

I made a thorough examination with the ophthalmoscope, but was unable to find any error of refraction; there was, however, a slight flush over the face of both discs.

I also examined him for insufficiency (after Steven's method) with the greatest possible care, only to meet with negative results.

He did not use tobacco nor stimulants to excess, but I induced him to discontinue both; still the asthenopia harassed him.

Inquiring more particularly into the nature of his occupation, I found he was a "turner," working ten hours a day on a lathe, with his work revolving at the rate of fifty revolutions to the minute.

With his gaze fastened on a steel cylinder revolving at such a rate, and only relieving the strain on his eyes by pausing to set "calipers" to a fraction of a line, I was no longer at a loss to account for his trouble, and felt not a little chagrined by my own carelessness in not having detected it sooner.

I recommended him to take a week's rest under atropine, and at the expiration of that period to have his work changed from that of a turner to some other branch, which he did with the reward of being entirely relieved from his malady.

To my mind this was a case of asthenopia due to anæsthesia retinæ.

I am aware that this is a term that has been severely objected to by many prominent writers. In Dr. Herman Wilbrand's very able paper on Neurasthenic Asthenopia and so-called Anæsthesia Retinæ (*Knapp's Arch. Ophthal.*, v. XII, page 428), he says:

"Anæsthesia retinæ is not an independent disease, but is a local expression of a general nervous diathesis."

And by the twenty-four cases he cites this is pretty conclusively proven.

Wolfe, in his lectures on the eye, does not speak of it at all, but takes the ground with Donders that "asthenopia is always the result of latent hypermetropia," and claims it should be called "*Fatigue de l'accommodation.*"

Schweigger admits that such a thing may exist in a healthy person, but lays great stress on hysteria. Liebreich gives instances of obscurations of the field of vision, lasting from half

a minute to one minute, which he classes under the head of sympathetic irritation of the retina. Steffan speaks of cases nearer to the one I have given, and proposes the name "contraction of the field of vision, without anatomical lesion." Mauthner simply gives a few authorities on the subject, and says:

"The disease is characterized, on the one hand, by a diminution of the acuteness of central vision, and on the other by anæsthesia of the peripheral portion of the retina, so that the field of vision is concentrically contracted in a very uniform manner in all directions."

I have been unable to find in the works at my command any name under which I can reconcile myself to classify this case. It is a well established fact, that a person viewing from a car window a rapidly moving train in close proximity, will experience an asthenopia of greater or less duration when he attempts to resume reading or any near work.

What is such a phenomenon due to? Surely some embarrassment of the retina's function by direct irritation, independent of the nervous system at large.

TRANSLATION.

FRENCH SOCIETY OF OPHTHALMOLOGY.

The following interesting article and discussion are translated from the report of the *Archives d'Ophtalmologie* on the meeting of the French Society of Ophthalmology:

Why is it so Difficult to Cure Detachment of the Retina?

BY PROF. DE WECKER.

As well in ophthalmology as in general medicine, pathological anatomy guides our attempts to cure, and furthermore explains our success or non-success. It is true that empiricism only too often interferes with this natural manner of things. With regard to this point we need only contemplate what has happened and is as yet being done against a symptomatic affection, glaucoma, the therapeutics of which, if ever so happy, have their origin almost solely in empiricism.

Those who desire to get a little amusement and who want to know how far bad reasoning and want of logic can go, if it is wished to hide the truth at any price, need only read the recent articles by Leber on the history of iridectomy in glaucoma, and of Jacobson who has just given us new contributions to the theory of glaucoma.

As far as the therapeutics of detachment of the retina are concerned, we can neither say, that empiricism as yet has helped them much, nor, that the anatomico-pathological researches have given us indications which are capable of guiding us in our therapeutic attempts. We have surely a right to demand of

pathological anatomy the solution of at least one part of its task, that is, to explain to us, why in the treatment of detachment of the retina failures are in fact as yet almost the rule.

The unexpected results which the therapeutics of glaucoma had empirically given at an epoch even when the gross alterations produced by glaucoma had not yet been recognized, gave birth to the hope that the detachment of the retina might meet with an equal good fortune. In consequence, without much considering the anatomical basis of this malady and the mechanism which guides its evolution, operations have been devised and multiplied which proposed either to evacuate the subretinal fluid,or simply to copy the therapeutics of glaucoma.

It was instantly admitted that as soon as the sub-retinal fluid was evacuated, drained, aspirated, or led into the vitreous body, the retina would have nothing else to do but to quietly apply itself to its original support. Did the absence of any anatomico-pathological knowledge justify such an empiricism? Surely not; but having been so lucky in the cure of glaucoma, it was hoped, that, by modifying the process of evacuation, we might, by an equal chance, stumble upon the proper means of curing detachment of the retina.

In this a persistence has been shown which I think it is time to bring to an end, by first demanding of pathological anatomy to tell us why we have been so often deceived, and secondly, in what direction we have to make our further attempts.

The labors of Iwanoff, Leber and especially the intrinsic researches of Erik Nordenson, have not only shown us the pathological changes found in eyes that have been attacked by detachment of the retina, but also by what mechanism the retina becomes detached from its support. From these we can draw also the conclusions why it is so difficult for this membrane to become re-attached. It is actually possible to admit with Nordenson that the theory, that a retraction of the vitreous body is the original cause of the detachment, is well established.

Nordenson concludes with the following words: "Although H. Mueller had mentioned the detachment of the vitreous body, although Iwanoff had insisted upon the detachment of

the vitreous body as the forerunner of the detachment of the retina, and although Wecker had given it as his opinion, that the detachment of the retina was preceded always by the detachment of the vitreous body and a rent in the retina, one seemed to be little disposed to admit also the theory of shrinkage for the spontaneous detachments (of the vitreous body) which could be diagnosticated with the ophthalmoscope. It is the merit of Leber to have first demonstrated from an anatomical, experimental and clinical standpoint the retraction of the vitreous body and the rent in the retina by the formation of a spontaneous detachment (of the vitreous body) visible by means of the ophthalmoscope."

I have by no meass the intention to go here into the details of pathological anatomy to discuss whether the retraction of the vitreous body plays an exclusive role, or whether a wrinkling of the vitreous body does not also happen in a series of cases. What I want to state here especially as being established by the most competent anatomical researches, as those by Leber, Nordenson, Haensell and others, are the following facts:

That the detachment of the vitreous body precedes that of the retina.

That the detachment of the vitreous body may exist without inconvenience if it is limited to the posterior segment of the eyeball; as soon, however, as the detachment of the vitreous body reaches the equatorial region of the eyeball, so soon the antagonism begins between the vitreous body, which retracts, and the retina, which is normally more adherent in this region. A detachment of the retina becomes, therefore, the more threatening the farther the detachment of the vitreous body advances toward the neighborhood of the equator.

That there always exists an adhesion between the retina and the vitreous body (retracted or wrinkled), and that the retina is detached as soon as a rent is produced at one of the points of adhesion to the vitreous body. It is especially important to note that the adhesion to the rest of the vitreous body remains persistent, although the fluid accumulated in front of

the retina may have by means of such a rent got behind and in consequence have detached the nervous membrane. Furthermore, in simply evacuating this liquid toward the outside, or in trying to make a way for it into the vitreous body or in front of the retina, by an artificial opening, we in no way change the pathological adhesion of the retina to the vitreous body, and we put no obstacles in the way of the progress of the evil if the vitreous body keeps on retracting, or is still more wrinkled.

It is, then, the pre-existing pathological adhesion between the retina and the vitreous body which holds the nervous membrane fast, and which does not give way, let our method to evacuate the subretinal fluid be ever so ingenious. It is this adhesion which renders our operative attempts futile if they aim solely at such an evacuation.

Let me conclude. If we want to obtain a real cure of the detachment by operative means, we must first aim at detaching the retina from the detached vitreous body, and so to make it impossible for the nervous membrane to be forced to accompany the vitreous body in its forward march. What difficulties the solution of this problem presents all those will find out who, with me, would be willing to make any effort. Similar involuntary attempts in the primitive operations of von Graefe and Bowman have sometimes been crowned with success, and, I believe, as also does Leber, that it is probable that in these happy operations the adhesions were accidentally broken in the manœuvre which had for its object the formation of an artificial opening in the retina.

Discussion.

Boucheron.—You just have heard the theory, that the detachment is preceded by an affection of the vitreous body, upheld by Mr. DeWecker with great ability. Please allow me now to speak in defense of the opinion, that an affection of the uveal tract (ciliary body and choroid) is the most frequent cause of the so-called spontaneous detachment of the retina, and, that the affections of the vitreous body help only to ag-

gravate the detachment without playing the principal active part in its production. When the detachment is seen at its beginning, it is situated in most cases—and that is a very important point—in the upper portion of the eyeball. I here remind you of the recent observation of Gaupillat. As the fluid by its weight gradually descends toward the lower portion of the eyeball, the upper portion of the retina which was first detached becomes spontaneously re attached, at least if the quantity of fluid is a moderate one.

The primary seat of the detachment in the upper portion corresponds to a lesion of the ciliary body, localized upward in the great majority of the cases. Why, I do not know. This cyclitic lesion, a mild cyclitis, is proven symptomatically by a slight pain on pressure with the finger, and by floating opacities in the vitreous body.

In fact the ciliary body, which is inflamed (generally in consequence of rheumatism), exudes a fluid which contains a great deal of fibrogenous material, and its coagula form the floating opacities in the vitreous body. When this inflammation spreads in the neighboring choroid the resulting exudation produces a detachment of the retina. The pressure of this exudation forces the retina inward. and, in doing so, pushes the vitreous body back, the fluid portions of which escape by the excretory channels which have remained open. The pressure of this cyclo-choroidal exudation is renewed periodically, as is the case with rheumatism in other regions. In this way the sub-retinal fluid increases in quantity, or is re-produced after having been absorbed. The vitreous body thus being pushed back by the detached retina, encumbered with fibrinous floating opacities, ready to become organized, its fibres become shorter and contract. When this contraction is once produced, the retina follows it and can no longer return to its normal position. In order to accomplish this it would be necessary, as in the operation of Létiévant and Estlander on the thorax, to press the shell of the eyeball towards the retina and the contracted vitreous body.

It is, therefore, impossible to cure a detachment, except in

its beginning, before the contraction of the fibres of the vitreous body has taken place, and on condition, that no new exudation takes place by any further cyclo-choroidal or cyclitic attacks. The rents in the retina do not as a rule lie upward, but downward, or to the side, and we must, therefore, in most cases consider them as caused by a necrosis in consequence of bad nutrition, due to the detachment of the retina, or as caused by the pressure of the exudation.

This proves them to be secondary and not primary occurrences. Pathological anatomy has furnished us with positive facts only in cases of very recent detachment, when only primary lesions are found, as for instance in cases of incipient sarcoma of the ciliary body. In these cases, as far as my studies teach, we find only a cyclo-choroidal exudation, but neither a rent in the retina nor a detachment of the vitreous body; on the contrary, in cases in which the detachment is old or in important experimental lesions (injection of cantharidine [Boucheron], or naphthaline [Panas] into the supra-choroidal space) the exudation passes through the retina in different places, and may in this manner detach the vitreous body. Such lesions are due to the greater intensity of the process, or they are of long standing.

Abadie.—I am sorry I cannot agree with my eminent teacher, Mr. DeWecker, on a question of such importance, and I am astonished that he, who has done so much for ophthalmic surgery, seems to despair of curing the detachment of the retina. I do not think, that pathological anatomy is apt to clear up the pathogenesis of this disease, because the eyes which have been enucleated in consequence of detachment of the retina, present, so to speak, terminal lesions which are the consequence of the disorganization of the eyeball, instead of being its cause.

From a clinical standpoint it is difficult to admit, that it is the contraction of the fibres of the vitreous body which causes the detachment of the retina, because we see the detachment taking place in myopic eyes with absolutely normal media, and which, the day before, presented no functional trouble, no

alteration that could be distinguished with the ophthalmoscope. It seems to me that in myopic eyes the true mechanism of the detachment is a totally different one. Let me ask in what point myopic eyes differ from others. It is in the elongation of the antero-posterior axis. The elasticity of the tissue of the sclerotic allows of its distension, it is, therefore, not the retina which becomes detached. When a puncture is made the retina becomes reattached for several days, and then is again detached. Why? Because on the one hand no adhesions have been formed, and on the other, the sclerotic which had in some measu e returned to its normal shape after the evacuation of the fluid, begins again to become distended.

In order to insure a cure it would then be necessary, first, to obtain an adhesion of the retina at the place of puncture, and, second, to prevent effectually the distention of the eyeball. I have tried to obtain this double end in the following manner: Before making the puncture I perform sclerotomy, thus allowing the eyeball to contract and to maintain a reduced intra-ocular pressure. In the second place I produce a local irritation at the site of the puncture. The delicate point here is, not to let this irritation go beyond a certain measure. I have once injected one drop of Piazza's fluid. The result was satisfactory. When I tried to increase this dose, and injected three drops, the affection became aggravated.

Sclerotomy combined with simple puncture yields more lasting improvements than all other procedures.

Gorecki.—I am absolutely convinced that the term detachment of the retina has been applied to a number of very different pathological conditions. I only remind you of the discussion which we had here two years ago. A certain number of our colleagues stated that they had seen and, what is more, had cured within a few days a great many cases of detachment of the retina by pilocarpine, iridectomy, galvanocautery, etc. At that moment it seemed as if there was nothing more easy than to cure a detachment of the retina, and we who could not succeed in getting such beautiful results, looked around for an explanation.

The inquiry which you have instituted has brought about a juster view of these facts, and of such a hope of an easy cure for detachment of the retina, and we now know, that we have to eliminate a certain number of cases as false detachments. But, even if we speak only of real detachments of the retina, we have to distinguish between detachments which are the consequences and, so to speak, the height of different pathological processes, and secondly, those which, on the contrary, are their beginning. These two different kinds of detachments must necessarily call for a very different treatment and prognosis. It is impossible to uphold the idea that all detachments of the retina are produced by contraction of the vitreous body. We have to deal with two affections which are distinct, at least for a short period; namely, first, the detachment of the vitreous body, and, second, the detachment of the retina. One remark made by Mr. DeWecker is perfectly correct, namely, the one stating, that equatorial lesions render the prognosis more grave. A limited posterior detachment may become cured, when, on the contrary, it has reached the equatorial region, it will never recede. The same is the case with a traumatic detachment.

Meyer (Paris).—There is one point in Mr. DeWecker's communication which, it seems to me, ought to be cleared up, namely, what is the relation between the detachment of the vitreous body and the detachment of the retina. If I have understood our colleague well, he thinks, that in future our surgical attempts must aim at prohibiting the retina from following the contraction of the vitreous body, or at separating the adhesions between the vitreous body and the retina, which latter, he thinks, becomes more and more detached as the contraction of the vitreous body progresses. It seems to me it would be necessary to be first sure that such adhesions exist. On the other hand, it would follow from DeWecker's communication that the affection begins with a large detachment of the vitreous body. Now, in order that such a one can be produced, it is necessary that the vitreous body, far from being adherent to the retina, be detached from it ; since if the

retina, being adherent to the vitreous body, follows it in its contraction, we can no longer speak of a detachment of the vitreous body, and we have to deal with a detachment of the retina.

De Wecker.—In my answer I shall of course only speak of true detachments, and not of the false ones to which Mr. Gorecki had reference. It has been established for a long time, that detachments of the vitreous body precede those of the retina. What is new, and what Leber and Nordenson have well established, is the constancy with which alterations are found in the vitreous body. To Mr. Abadie I have to say, that even if the vitreous body appears transparent, it is by no means proven, that it is not diseased. On the other hand I have to add, that if we are but seldom able to see the rent in the retina, it is because it generally lies very peripherically, or it may be hidden by a fold of the detached portion. Histological researches, furthermore, have demonstrated the constancy of a rent in the retina. I certainly come back to my former conclusion, and I want to advise my collegues to renounce all operative procedures ordinarily in use, and to take up new procedures inspired by more recent histological researches.

AMERICAN OPHTHALMOLOGICAL SOCIETY—24TH ANNUAL MEETING HELD AT PEQUOT HOUSE, NEW LONDON, CONN., JULY 18 AND 19, 1888.

WEDNESDAY, FIRST DAY.—MORNING SESSION.

The Society was called to order by the President, Dr. W. F. Norris, of Philadelphia. The deaths of Dr. C. R. Agnew, Dr. E. G. Loring and Dr. Joseph Aub were reported.

Dr. H. D. Noyes, New York, read a memorial of the late Dr. C. R. Agnew.

Drs. W. H. Carmalt and C. S. Bull were appointed a committee to prepare an appropriate minute in regard to the death of Dr. E. G. Loring, and Dr. Chas J. Kipp was appointed to prepare a similar minute in regard to the death of Dr. Joseph Aub.

The members of the American Otological Society were invited to take seats with the Society. The following gentlemen were invited to take part in the discussion, Dr. Koller (Vienna), Dr. Skinner and Dr. Nodine.

A Contribution to the Treatment of Membranous Opacities in the Vitreous, by Dr. C. S. Bull, New York.

These opacities in the form of membranes or shreds are rarely freely movable, and usually resist internal treatment. Operation by incision with a needle was first performed by Von Graefe. In the experience of the writer the operation had been found useful. Some opacities as a result of hæmorrhage or inflammation of the choroid sometimes respond to internal remedies, but as a rule they fail. By incision of the membrane a direct improvement of vision may be obtained and the process of absorption may be stimulated. Posterior opacities are more easily reached with less danger to the lens, and with more favorable results than in the case of anterior

opacities. The author has done this operation in seventeen cases of chronic membranous deposits in the vitreous. In some cases the ordinary discision needle was used, in others a broader needle, and in a few a slender cataract knife. Cocaine was employed in all cases. The point selected by preference for the introduction of the needle was just in front of the equator of the eye and below the insertion of the external rectus muscle. There seems in this operation to be no danger of loss of vitreous through the small opening, nor is there danger of hæmorrhage. The puncture should be posterior to the ciliary process and pressure with the forceps should be avoided. Little or no reaction follows the operation as a rule. A protective bandage is required only a few days. Antisepsis was employed in all cases.

The details of the seventeen operations on fifteen patients were given. Fourteen showed decided improvement in vision. There was no loss of vision from the operation in any case. The operation is appropriate in certain cases, but it is wise to wait until all inflammatory symptoms have subsided before attempting any operative procedure. The eye should be absolutely free from all irritation before surgical interference is attempted.

Discussion.

Dr. W. F. Mittendorf, New York.—I think that vascularity of the vitreous membrane should always speak against operations of this kind. Vascularity, even if all inflammatory signs have subsided, points to a fatal prognosis.

A Case of Pulsating Exophthalmos cured by Ligation of the Common Carotid by Dr. F. Buller, Montreal.

Pulsating exophthalmos occurring spontaneously or as a result of traumatism is rarely met with. The pathology is so well understood, that little remains to be done in this direction at the present time. In the matter of treatment, there is no rule so firmly established that much must be left to the judgment and discretion of the surgeon.

The author had seen four cases of this affection. In the

first the condition followed a blow upon the head. Some months after the appearance of the pulsating exophthalmos, ligation of the carotid was performed, but the patient died in the course of a few weeks from repeated attacks of epistaxis.

The second case has been already reported.

In the third case the affection followed a blow on the brow from a piece of iron. The patient was seized with severe epistaxis, and died in a few minutes. There was found a depressed fracture of frontal bone with a fissure extending across the orbital roof and body of sphenoid bone directly beneath the cavernous sinus. As a result of caries of the bone there was a direct communication between the nasal cavity and the internal carotid artery.

The fourth case, the subject of the paper, came under observa- May 24, 1888. A young man, aged 28, fell a distance of 20 feet, striking the right side of the head, rendering him unconscious for 24 hours. After the swelling had subsided the patient noticed diplopia, one image being higher and less distant than the other. There was also a loud beating sound in the right ear. Two weeks before coming under observation, prominence of the eye was noticed. There was still diplopia, the higher image moving up and down with each heart-beat. Four days before coming under notice, the pain became intense. On examination there was at the inner extremity of the right brow a swelling which imparted a distinct thrill to the fingers. There was also a harsh bruit. Pressure over the common carotid diminished the intensity of the thrill, and lessened the pulsation.

It was decided to ligate the common carotid in the upper part of its course, and this was done May 25, two ligatures being applied, and the vessel divided between them. The immediate effect was softening of the swelling, partial reposition of the eye-ball, great diminution in the pulsation and disappearance of the bruit. The patient made a good recovery and left the hospital with very little prominence of this eyeball: V. $=^{20}/_{xx}$; movements normal.

Pulsating Exophthalmos, by Chas. J. Kipp, Newark.

A lady, 76 years of age, presented herself with the history, that shortly after striking the head in a fall, she noticed noise in both ears, followed by protrusion of both eye-balls, the right $^{4}/_{10}$ inch; the left $^{2}/_{10}$ inch. There was no marked pulsation but there was a thrill, and a bruit could be heard over the anterior half of the head. This could be arrested by compression of the right carotid, and partially so by compression of the left carotid. In view of the age of the patient, no radical measures were recommended, but it was suggested that pressure be made on the right carotid as often as convenient. Iodide of potassium was also given. Three months later the patient stated that the noise had suddenly disappeared. This was followed by disappearance of the exophthalmus, first in the left eye and subsequently in the right. The external appearance of the eyes is now normal. There is, however, a marked pulsation of the right sub-clavian artery, but no aneurism can be discovered.

Discussion.

Dr. S. D. Risley, Philadelphia.—I would call attention of the Society to the fact that Dr. Harlan reported a case of this kind cured by compression, and that I also reported a case in which compression of the vessels for a short time was followed by disappearance of the symptoms and subsidence of the exophthalmos.

An Analysis of 576 Cases of the Refraction of Healthy Human Corneæ, Examined with the Ophthalmometer of Javal & Schiötz, by Dr. Swan M. Burnett, Washington.

These 576 corneæ belonged to 301 persons examined within a little over a year by Dr. Burnett. Pathological states of the cornea were excluded for consideration at another time. The corneal refraction was found to be the same in both eyes to within 0.25 D. in 110 persons. The horizontal meridian (to within 5°) was the least refractive (astigmatism according to the rule) in 420 eyes. The vertical meridian was the least refractive (astigmatism against the rule) in 20 eyes. In 88 eyes the meridians were oblique. In 58 eyes the difference in the refraction of the two meridians was less than .25

D. In 101 eyes there was emmetropia. The largest number had a corneal refraction of from 44 D. to 45 D.; the next largest from 43 D. to 44 D. The strongest corneal refraction was 47 D., the weakest 39 D. In 55 eyes there was simple myopia. The strongest refraction in the weakest meridian was 47.25 D.; the weakest 39 D. The corneal refraction did not in any considerable number of cases bear any close relation to the degree of the myopia. Simple hypermetropia was present in 59 eyes. Weakest refraction in the weakest meridian was 40.5 D., the strongest, 46 D. As in myopia the corneal refraction was no indication as to the degree of general hypermetropia. Myopic astigmatism was found in 140 eyes. In 4 eyes the general astigmatism was greater and in 11 it was less than the corneal. In 14 eyes the difference in the axes of the corneal membrane and that of the prescribed glasses was greater than 5°. Hypermetropic astigmatism was present in 96 eyes. In 4 eyes the corneal astigmatism was greater and in 2 eyes it was less than the general. The axes corresponded in all but 9 eyes. Compound myopic astigmatism existed in 63 eyes. In all but 7 eyes the corneal and general astigmatism corresponded, and in 44 eyes the axes corresponded. Compound hypermetropic astigmatism was found in 55 eyes. In 31, corneal and general astigmatic meridians corresponded. The corneal and general astigmatism was the same in all but 4 eyes. Mixed astigmatism was present in 8 eyes; in 4, the corneal and general astigmatism was the same; in 2, the corneal was less and in 1 greater than the general. Corneal and general astigmatic meridians were the same in 5 eyes.

In 42 eyes the general astigmatism was against the rule, while in only 18 of these eyes was the corneal astigmatism against the rule. From examinations under a mydriatic, the author felt himself warranted in thinking that many cases of lenticular astigmatism are due to an oblique position of the lens.

Corneal astigmatism is, with very few exceptions, according to the rule (vertical meridian the stronger). From a study of these statistics the author feels warranted in concluding that

while the corneal refraction gives no indication of the general refraction of the eye, its astigmatism in the vast majority of cases, expresses the general astigmatism both as to degree and direction of its axis, and considers, therefore, the instrument of Javal and Schiötz one of, if not the most important, instrumental means for the diagnosis of the anomaly. He does not think astigmatism more productive of progressive myopia than any other form of ametropia.

Discussion.

Dr. H. D. Noyes, New York.—I have used the ophthalmometer of Javal and Schiötz with great satisfaction. In the immense majority of cases the evidences of the ophthalmometer without the use of atropine have corresponded with the evidences of the trial case. The amount of astigmatism and in a general way the axis of the astigmatism is obtained. The use of this instrument has led me to believe that mixed astigmatism is more common than we usually imagine. I have also noted the influence of the eyelids in altering the curvature of the cornea. I have also satisfied myself that the tension of the eye-muscles modifies the curvature of the cornea. I have also noticed in some cases a pulsation of the corneal reflex due to the fact that the cornea was so thin that the circulation of the eye impressed itself upon it. This I have seen particularly in conical cornea. The use of this instrument does away to a large extent with the necessity for the employment of atropine.

Dr. Sam'l Theobald, Baltimore.—I infer that the author thinks, that when a mydriatic is employed, the lenticular astigmatism is done away with. My experience leads me to believe that the asymmetrical condition in the lens does not at once disappear on paralysis of the ciliary muscle. I think that the discrepancy between the total and general astigmatism may often be accounted for by this persistent asymmetrical condition of the lens. This condition gradually disappears after suitable glasses are worn.

Dr. B. Alex. Randall, Philadelphia.—I cannot agree with the author that simple astigmatism is so common and pre-

dominates over other forms. Taking the records of the Hospital of the University of Pennsylvania for the last ten years I find 4000 refraction cases, determined, almost without exception, under a mydriatic. Compound hypermetropic astigmatism constituted about 40% ; compound myopic astigmatism constituted 30% ; simple myopia and hypermetropia about 8% and 12% respectively. Mixed astigmatism only about one or two per cent. Compound astigmatism constituted at least 70% of the total number of cases.

Progressive Hypermetropic Astigmatism, was the title of a paper read by Dr. J. B. Emerson, New York.

Dr. Edward Jackson, Philadelphia, exhibited a new form of cataract knife. It was designed to combine the advantages of the Graefe and Beer knives. The point, resembling that of the Graefe knife, allowed the puncture and counter puncture to be made in the same way as with the Graefe knife, whilst the rest of the blade having the shape of Beer's knife, enabled one to complete the incision as with that instrument. With it the puncture and counter puncture are completely under control, the flap is completed at a single thrust, the aqueous is not lost until the incision is nearly finished, and the counter-pressure by the back of the knife assists in steadying the eye.

Dr. J. O. Tansley exhibited the following instruments:

An improved lachrymal syringe, in which the nozzle ends in a closed bulb, the openings being on the sides of the tube.

A clamp to prevent the passage of atropine solutions through the lachrymal duct into the nose in cases where the free use of atropine is called for.

An improved lachrymal probe and improved style.

Dr. Sam'l Theobald, Baltimore, exhibited probes made of aluminium.

Œdema of the Choroid and Retina, by Dr. Edward Jackson, Philadelphia.

The author reported the case of a young man struck in the eye with a marble or small stone, causing a bruise of the eyeball. The ophthalmoscope showed localized swelling of the choroid and retina at the posterior pole of the eye; the cho-

roidal spots having the usual grouping of ruptures of the choroid in this region. These spots disappeared in about a week. There was also at first some 0.75 D. myopic astigmatism which gradually diminished, and in three weeks entirely disappeared leaving the sight perfect.

Symptomatic Myopia, by W. F. Mittendorf, New York.

But little attention has been called to myopia as a symptom of various affections of the eye. Three forms of myopia may be spoken of viz. axillary, refractive, and symptomatic. The latter form may be caused by traumatism, but more commonly by diseased conditions. It may be produced by displacement of the lens forward. More frequently it is due to swelling of the lens accompaning beginning cataract. This is sometimes relieved by the use of concave glasses; very strong glasses being occasionally required. Plastic exudations may also cause myopia, but these usually so interfere with vision that it is impossible to demonstrate the existence of myopia. Glaucoma, serous choroiditis and iritis are frequently accompanied with myopia as a symptom. A number of illustrative cases were cited. In these cases the myopia is not permanent, but as the disease disappears, the myopia passes away, leaving the refractive condition of the eye the same as before the attack.

Discussion.

Dr. J. O Tansley, New York.—Some years ago I reported a case of localized exudative choroiditis just beneath the macula with myopia. The myopia gradually increased as the attack reached its height, and as the inflammation subsided, the myopia passed away.

Dr. Carl Koller, Vienna.—I think that in these cases of myopia in iritis the condition may be due to the irritation of the ciliary muscle. There is hyperæmia of the ciliary body, and as the pupils are contracted, it is to be supposed that the ciliary muscle is also contracted. Although atropine may be used there is not full dilatation of the pupils. It is, therefore, reasonable to suppose that the myopia is the result of spastic contraction due to inflammation.

Dr. S. D. Risley, Philadelphia.—In a few instances it has

seemed to me that in these cases of iritis and choroiditis the myopia was due to the dread of light and the cramp of the lids.

Dr. John Green, St. Louis.—In two attacks of iritis, of which I was myself the subject, I carefully studied this myopia. In my case the eyes were completely under the influence of atropia. The pupils were dilated and the ciliary muscle paralyzed.

EVENING SESSION.

Hysterical Blindness in the Male, with a report of three cases, by Dr. Willam Oliver Moore, New York.

The average proportion of cases of hysteria in the male to hysteria in the female is 1 to 15.

CASE I.—Male, æt. 25, farmer, family history good. During past two years had suffered with nervous symptoms. Did not smoke or drink, In June '86, complained of failing vision in left eye. When seen June 16, according to patient's own statement vision in left eye=0. In right normal. Ophthalmoscope showed normal fundus except a slight notch of opaque nerve fibres near the papilla. Testing with prism and candle gave double vision as did pressure on one eye-ball. The patient was informed that treatment by electricity would cure him in a few days. A reverse faradic current was applied, causing the patient to jump from his chair exclaiming that there already was an improvement. In ten days $V=^{20}/_{xx}$, emmetropic.

CASE II. Male, æt. 22, student and farmer, fine looking. History of insanity in the family. Eighteen months previous to coming under observation atropia had been instilled by a physician to determine whether or not glasses were required. He thought from the effect of the atropine that he was going blind. He then put on smoked glasses, subsequently bandages and kept in a dark room. He would not open the lids and declared that he was blind. For ten months he kept in a dark room with covering over the eyes. On examination the lids were closed but not by spasm; the cornea clear, V=0. Ophthalmoscopic examination under ether, normal fundus. Hys-

terical blindness was diagnosed, and a favorable prognosis given. Canthoplasty was then performed. Coming from the ether the patient opened his eyes and evidently saw clearly. He was told that the cause of the disease had been discovered and that he would be well in a few days. In two days he was walking around without glasses. Has remained well since.

Case III. Boy, æt. 15. Developed blindness in right eye after a disappointment at school. Normal appearance of eyes. Tests with prisms and colored glasses showed that vision was present. Ether was administered and patient assured that he would be well and under electricity recovery was rapid.

Description of a Series of Tests for the Detection and Determination of Sub-Normal Color-Perception, (Color Blindness) Designed for Use in Railway Service, by Dr. Charles A. Oliver, Philadelphia.

It is a well known fact, both from theoretical and practical stand points, that many "color blinds", especially those of medium grades have the power of differentiation even by daylight of the most difficult colors when placed at ordinary metre distance of wool selection employed in the detection and determination of "color blindness". The writer has been induced through a hope to overcome the dangers that might arise from this power in situations, such as railways, marine, and naval service, where the safety of lives and protection of property is oftentimes solely dependent upon proper recognition of color at great distances, and frequently through the intervention of more or less translucent media, to combine two modifications of his method of color selection to a simplified plan of the former procedure by which the candidate is placed in the actual position of after-work and under exactly similar circumstances as during employment. The method is divided into three parts.

First. The selection and registry of a definite number of loose wools from 23 pure and confusion match skeins thrown upon a dead black surface at one metre distance.

Second. The selection and registry of the same number of similar reflected colors under various intensities of diffused daylight stimulus, placed at distances requisite for safety.

Third. The selection and registry of transmitted colors under various intensities of artificial light stimulus placed at distances requisite for safety.

In addition to the advantages shown refer to the first test alone. The method has the following additional ones.

(1) Much faster in time than any other method; (2) The selection of loose wools at a distance; (3) No necessity for an expert except in doubtful cases; (4) Employment of the same character of signals for testing as is used in daily routine; (5) Placing the eye during testing at a distance necessary for future safety; (6) Bringing the eye during testing directly before the true condition of weather experienced whilst it is upon duty; (7) Test and match colors all graduated in proportionate sizes.

Case of Embolism of the Central Retinal Artery, by Dr. Charles A. Oliver, Philadelphia.

The patient, a young man, was seen October 5, 1887. Twenty-six hours previously, while walking in the shade, he was suddenly seized with blindness in the left eye. There were no other symptoms, and there had been no previous illness. The right eye was normal, Ophthalmoscopic examination of left eye showed clear media; nerve substance of a grey tint and swelling of the retina. All the retinal vessels were reduced in size. The veins were somewhat contracted especially toward the nerve entrance. The characteristic cherry spot in the macular region was distinct. There was a small hæmorrhage out from the disk. Careful physical examination failed to reveal any lesion in other parts of the body. The case was kept under observation for some time, but there was no return of vision, the patient remaining completely blind in the left eye.

Discussion.

Dr. H. D. Noyes, New York.—The result of autopsies shows that the great majority of these cases are really due to thrombosis and not to embolism.

Thursday, Second Day.—Morning Session.

A case of Double Congenital Irideremia in a Child whose Mother Exhibited a Congenital Coloboma of each Iris, by Dr. Sam'l Theobald, Baltimore.

James O., æt. 18 months, was seen Dec. 9, 1887. His mother brought him on account of the red appearance which the pupils presented. Upon examination, besides a congeninal squint of the left eye, complete absence of each iris was discovered. The lenses were clear, and there seemed to be, at least in the right eye, fairly good vision. The interest of the case lies in the fact, accidentally discovered, that there existed in the mother a congenital coloboma of each iris. In her right eye the coloboma was large, its direction being directly upwards; in the left eye it was somewhat smaller, and was in an upward and outward direction. In neither eye was the choroid involved in the congenital defect. The mother volunteered the statement that an older child had had a similar appearance of the eyes, so that it is probable that to this mother with congenital coloboma, there were born not only one but two children with absence of the irides.

Discussion.

Dr. David Webster, New York.—I think that the direction of the coloboma in the mother's eye was unusual. I have seen a number of cases of congenital coloboma of the irides, but I do not recall an instance in which the coloboma was upwards. It is almost always downwards.

Dr. B. Alex. Randall, Philadelphia.—Having had occasion to look up the literature of this subject, I can say that there is a number of cases reported of coloboma inwards or outwards, but not upwards. This case seems to be unique in this respect.

Puncture of the Retina for Detachment, by Dr. T. Y. Sutphen, Newark, N. J.

The results of three operations were reported.

Case I.—A male, 62 years of age, sought treatment April 1, 1887, for a cloudy appearance before the right eye. This he had noticed only a few days. He was near-sighted, but had never used glasses. Examination. R. V.=$^{15}/_{C}$, raised to $^{15}/_{XX}$. by $-^{1}/_{16}$. Field of vision defective downwards and toward the median line. Tension slightly diminished. L. V.=$^{15}/_{C}$, raised to $^{15}/_{XV}+$ by $-^{1}/_{16}$. Ophthalmoscope showed myopia

with choroiditis in both eyes. In the right eye the retina was found detached in its upper and temporal portion. The patient refused to undergo vigorous treatment in bed. He was given iodide of potassium in gradually increasing doses, rest being enjoined.

Five months later the patient returned with commencing detachment in the upper and temporal portion of the left retina. He was then kept in bed for two weeks with the eyes bandaged, while profuse diaphoresis was frequently induced, but without benefit. He was then sent to the country, the iodide being continued. By Dec. 1, there was in the right eye only perception of light; in the left there was vision confined to the outer and lower field. On this date puncture of the retina from beneath the detachment was made. Thorough antisepsis was employed; cocaine was instilled. A sickle shaped needle was thrust into the globe between the insertion of the external and inferior recti muscles, on the equator and on a plane with the lens, it was pushed onward until it was thought that the retina had been pierced. It was then withdrawn with a sweeping motion, the object being to enlarge the opening in the retina. Atropine was instilled, the eyes bandaged and the patient ordered to keep quiet. The following day, the subretinal fluid had disappeared, field of vision was normal, a red reflex was obtained from the fundus in every direction and the patient could distinguish large objects. Bandage was reapplied. Two days later patient could count fingers at twelve feet, the retina appeared in its normal position but the vitreous was quite cloudy. The vision continued steadily to improve. Dec. 10, a similar operation was performed on the left eye. Two days later there was marked enlargement of the field of vision but some detachment was still to be seen on the temporal side. Dec. 16, field of vision in both eyes normal. No detachment of retina in either. The patient remained in bed 28 days. Feb. 10, detachment began to reappear in the left eye and by March 3d it was as great as before. Needling was again performed with the escape of very little subretinal fluid. March 5, field again normal. April 1, partial return of detachment in

left eye. July 6th, seven months after first operation R. V.= $^{15}/_{C}$ raised to $^{15}/_{XL}$ by $-^{1}/_{20}$, no return of detachment, field of vision normal, blindness for red. In the left eye almost complete detachment of the retina.

After referring to the history of the operation, the speaker said that the interesting facts were these : the apparently perfect safety of the operation under the modern antisepsis; one success and two failures under exactly similar conditions, barring the escape of the fluid outwards in the successful case; encouragement to try this operation in otherwise incurable cases ; the absolute freedom from all reaction. The best results will probably follow where the operation follows closely upon the subsidence of the acute affection causing the detachment. The chances of success are increased by a free flow of fluids outwards. It was suggested that a narrow Graefe knife might be used after accurately measuring the depth of the detachment, provided the point be so directed that the wound in the retina shall be directly opposite the scleral puncture.

Discussion.

Dr. J. L. Noyes, Detroit.—I have tried operative procedure in only one case. I drew off the fluid with a hypodermic syringe. After drawing off the fluid the retina returned to its normal position and the outline of a small tumor was discovered. The detachment soon returned: the ball was enucleated one year later.

A Case of Glioma, by Dr. F. P. Capron, Providence.

The patient was a child $3^{1}/_{2}$ years of age. The growth was removed, but has since involved the submaxillary glands and the glands in the neighborhood of the ear. Photographs showing the appearances, were presented.

Discussion.

Dr. D. B. St. John, Hartford.—I would ask whether aid in the diagnosis between glioma and other affections is obtained by attention to the state of the tension.

Dr. David Webster, New York.—I think that I have never been able to detect any increase of tension until the second or inflammatory stage has been reached. Then there is always,

I think, increase of tension. In at least two cases, I have diagnosed glioma from the history with the existence of increased tension, when a tumor could be discovered. There is now on record a case in which Dr. C. R. Agnew removed both eyes of a child one year of age, for glioma. This was fifteen years ago, and the individual is still living. In this case the diagnosis was verified by microscopical examination. In some cases where the diagnosis was made, but enucleation refused the patients are still alive and the disease has not progressed, retrograde metamorphosis having, it is said, taken place.

The President, Dr. W. F. Norris.—My impression is that in true glioma, retrogressive metamorphosis does not take place. Fatty degeneration may occur in parts of the growth, but I am not aware of a case in which the growth entirely disappeared. Such cases are, I think instances of mistaken diagnosis. The diagnosis is difficult unless the growth has reached such a size that the vessels may be seen in it.

Models Exhibiting Refraction by Cylinders, by Dr. Swan M. Burnett, Washington.

It was shown how the refraction and focal line change with the variation in the strength of the lens and with the alteration of the angle of crossing their axes. The models were made at his suggestion by Mr. C. F. Prentice of New York. Diagrams were exhibited showing by geometrical construction how it was possible to tell the course of any given ray after its refraction by any two cylinders of differing power and at any angle of crossing of their axes. A formula applicable to any axis of crossed cylinders calculated by Mr. Prentice was also shown.

Dr. B. Alex. Randall, Philadelphia, exhibited some drawings showing anomalous outgrowths upon the optic disk, and also drawings of anomalies of the retinal vessels.

Designation of Prisms by their Refractive Power, by Dr. Edward Jackson, Philadelphia.

The author pointed out the inconveniences and errors arising under the present method of designating the strength of prisms, and recommended their designation by their refractive power, as much more accurate.

A committee consisting of Drs. H. D. Noyes, Edward Jackson and Swan M. Burnett, was appointed to take the matter into consideration and report at the next meeting.

Extraction of a Partially Absorbed Calcareous Lens, by Dr. David Webster, New York.

March 15, 1888, C. C., æt. 23, consulted Dr. Agnew and the author, at Manhattan Eye and Ear Hospital. She had phthisis bulbi of left and in the right eye were the calcified remains of a mostly absorbed lens, with a discolored atrophic looking iris attached to the membranous mass by numerous adhesions. Visual field good. V=fingers at 2 feet. The vision of left eye had been lost through a blow with a whip at the age of two years. A catarrh developed in the right eye some time afterward. Seven years ago, (1881), her sight having been lost four months, both eyes were operated on by a surgeon in another city, several times. Violent imflammation followed one or more operations on each of the eyes. Eighteen months ago another needling was done by another surgeon, by which sight was somewhat improved. The atrophic eye of late has been painful and tender on pressure. March 16, Dr. Agnew enucleated the atrophic eyeball. A calcific plate was found in the choroid and a small calcareous lens. While the patient was still under ether, he did an iridectomy on the right eye. April 27, Dr. Webster divided with Knapp's knife-needle two or three of the adhesions which were on the stretch. At least one could be heard to snap when cut. An attempt to penetrate the thinnest looking portion of the membranous mass failed. There was considerable effusion of blood which was soon absorbed.

May 14, an attempt to remove the pupillary obstruction with a sharp hook failed, very little reaction.

June 6, with a keratome bent on the flat a wound was made as for iridectomy on the supero-nasal corneal border. The pupillary obstruction was drawn out and cut off close to the cornea, not a drop of vitreous escaped. There was some pain in the eye for 3 or 4 hours, probably the reaction from cocaine. Four days later pain again appeared and was relieved by iced cloths.

June 18, fundus normal, no floating bodies in the vitreous, but the remaining portion of the pupillary membrane, which by the way, was very thick and so tough that the iris scissors would scarcely cut it, extends backward horizontally and flaps up and down with the movements of the eye.

June 22, V=$^{20}/_{XX}$ with —$^{1}/_{32}$. Reads Jaeger's No. 1 with +$^{1}/_{2.25}$. June 26, discharged wearing the above spectacles.

Dr. Samuel Theobald, Baltimore, exhibited an unusually long cilium. The hair was over an inch in length, and was removed from the eyelid of a young lady suffering with some conjunctival irritation, the other cilia were of the usual length.

The officers for the ensuing year are: President, Dr. W. F. Norris, Philadelphia; Vice-President, Dr. Hasket Derby, Boston; Corresponding Treasurer, Dr. J. S. Prout, Brooklyn; Recording Secretary, Dr. Samuel B. St. John, Hartford.

It was decided to hold a special meeting for the consideration of scientific matters only, Sept. 19, 1888, at the Arlington Hotel, Washington, D. C.

The regular meeting will be held the third Wednesday, in July at the Pequot House, New London, Conn.

Adjourned.

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SYPHILITIC GUMMATA OF THE CILIARY BODY.

DR. S. C. AYRES, CINCINNATI.

We are all familiar with the appearance of nodules or condylomata or gummy tubercles of the iris as seen in syphilitic iritis. They occur in a certain proportion of cases, and are considered as a stamp of specific origin. One or more may appear in the parenchyma of the iris and develop so as to protrude between its fibres. Their vascular covering sometimes gives them a brownish red color, at other times they appear like yellowish circumscribed elevations. They are often absorbed without rupturing, at other times they undergo a purulent or fatty degeneration, but are finally absorbed leaving only a scar in the fibres of the iris.

While this manifestation of syphilis of the eye is familiar to all, the appearance of gummata involving the ciliary body is comparatively rare. They are considered undoubted evidence of specific disease, and come pathologically under the same head as condylomata of the iris just mentioned.

The rarity of this disease has prompted me to present six cases in five persons for your consideration. They occurred in

persons who had previously suffered from syphilis. Four of these five persons belonged to the colored race. They all had specific iritis preceding the development of the gummata in the ciliary body.

In only one of these cases, that of Laura Corbin, did I have an opportunity of watching the development of the ciliary tumor, the others having fully developed previous to their admission into the hospital.

De Wecker, in *Ocular Therapeutics*, says that "gummy irido-choroiditis is an affection which may be justly called unforeseen when it breaks out in the ciliary body. Here within a space of three or four days, a prominence like a staphyloma will appear on the anterior portion of the sclerotic so marked that in cases in which it is seated under the upper lid, one might almost be disposed to believe that previous examinations had not been made with sufficient care."

This was certainly true in this case. In the case reported by Seggel in *Archives of Ophthalmology*, Vol. XI, he says that the projection of the sclerotic developed in a few days; and in the case reported by Drs. Loring and Eno the eye is said to have been destroyed within a day or two.

Case I. Kate Skillman, æt. 27, domestic, single, contracted syphilis three years and a half ago, and has been in the venereal ward several times. She is not well developed and is poorly nourished, and has syphilitic eruptions over her face and body.

She says that last December her eyes became inflamed, and it is evident from the appearance that she had an attack of iritis. The left eye is at present free from inflammation, and her sight is good. The right eye presents the following appearance: there is a yielding or bulging of the upper half of the sclera near the cornea. There are four or five hemispherically shaped nodules side by side. The eye is very sensitive and tender, the pupil is closed by a thick membrane and the iris is discolored. She says that this change in the sclera began about the middle of January.

March 4, I punctured all of the staphylomata as the eye was

painful and the anodyne did not seem to give her relief. They discharged a sanious fluid, and the eye became soft. Warm poultices were then applied, and in two or three days she expressed herself as decidedly better.

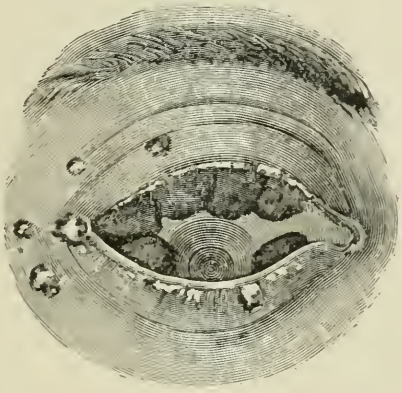


Fig. 5.

In the course of a month the right eye became considerably shrunken, but it was not sensitive to pressure so that enuncleation was not necessary.

Case II. Ernst Edwards, (colored), æt. 28, laborer, contracted syphilis one year ago which was followed by secondary eruption. He was admitted on account of the inflammation of his left eye and gave the following history:

He says that four weeks ago the eye became very painful and the vision decidedly impaired. A friend examining it found a small elevation in the upper portion of the sclera.

The present indication is that he has been suffering with suppurative iritis, as the chamber is nearly filled with pus.

There is a bulging of the sclera upward and outward in the ciliary region, extending backward almost to the equator, and the tension of the ball is considerably increased. The sclera is vividly injected, and the globe appears slightly ectatic. He has no perception of light and suffers constant and severe pain.

June 30, 1879. Poultices were used and gave great relief, and under their influence the pus in the anterior chamber began to be absorbed.

July 5. Eye more painful. I made a paracentesis of the cornea and evacuated the aqueous and pus, but could not remove a small mass of lymph that adhered to the iris.

July 6 and 8. Anterior chamber again opened. Eye quiet until the 15, when the staphyloma began to increase.

July 20. Eye painful, and sclera below is beginning to bulge in the ciliary region. The upper staphyloma was then freely incised evacuating pus and blood together with a sanious fluid. After this the eye soon atrophied and he was discharged a month later.

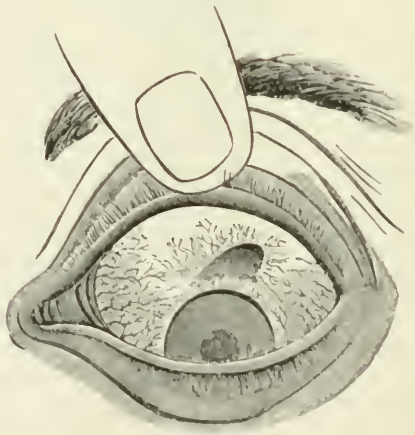


Fig. 6.

Case III. Elijah Craig, (colored), æt. 26, contracted syphilis a year ago which was followed by secondary eruption. Had an attack of iritis in both eyes several weeks ago and attended the Dispensary for a month past where atropine was used and a specific treatment was given internally. At present the pupil of the right eye dilates, but the left one is bound down by

a number of adhesions. He was ordered atropia for the eyes, bichloride and iodide internally, and for the relief of the pain warm poultices were used. Vision of right eye is good, but that of the left eye reduced to perception of light.

Feb. 10. The right eye very much better, pupil dilated and eye much freer from irritation. The left eye is very painful, with increased intra-ocular tension and deep scleral injection.

In the median line just behind the corneo scleral junction and in front of the superior rectus muscle is a bulging of the sclera. The sclera seems to have thinned at this point, and the intra-ocular pressure has caused a small circumscribed staphyloma somewhat conicle in shape. The upper portion of the iris is pressed forward in contact with the cornea as if from a growth or deposit behind it.

Poultices were applied, but the pain continuing, I punctured the staphyloma Feb. 15, as I had done in the other cases. This gave relief, and the eye became quiet and in time underwent a moderate degree of atrophy.

Case IV. Laura Corbin, (colored), æt. 18, single, domestic, had syphilis one year ago, and at present has a papular eruption over the entire body. She states that she had inflamed eyes one year ago. She has recently had an attack of plastic iritis from which she made a good recovery, the pupils dilating widely.

She has recently had that form of phlyctenular keratitis which is so persistent in the colored race. Both eyes have been affected and the corneæ are now studded with the scars of the successive crops of phlyctenulæ. She has been taking antisyphilitic treatment ever since she came into the hospital, Nov. 5. 1878. She complains of severe hemicrania which occurs daily in the afternoon. For the relief of this she was ordered sulphate of quinia in liberal doses.

Nov. 30. Eruption of the skin has cleared up, and her eyes are quite free from irritation.

I did not see her again until Dec. 6. In the mean time her right eye had become extremely painful. The pain came on

suddenly three or four days ago,and persisted without intermission in spite of atropine and anodynes.

The change which had taken place in her eyes in so short a time was something which I could scarcely believe. There had developed a small circumscribed staphyloma of the sclera about three inches below the lower border of the cornea in the region of the ciliary body into which the iris had prolapsed. There was no turbidity of the aqueous' but the eye was very sensitive to light and to the slightest pressure, and the tension was moderately increased.

It seemed incredible that this change could have taken place since I last saw her. The onset of the disease was sudden and violent, and it localized itself in the ciliary body, and caused such a thinning of the sclera as to allow the iris to prolapse into it.

I ordered anodynes internally and warm applications until the next day, when I punctured the staphyloma and evacuated its contents, which were principally aqueous, with pus and blood, and ordered eserine.

Dec. 9. Punctured the staphyloma again, as the eye was still painful. Three days later the eye was entirely free from pain. I determined to watch the other eye in case a similar change should begin in it, and accordingly saw her daily.

Dec. 30. The left eye became painful, and the lower portion of the ciliary region was quite sensitive to pressure.

Jan. 2, 1879. Eye very painful and the sclerotic beginning to bulge a little at a point corresponding with the staphyloma of the right eye.

Jan. 4. The sclera pointing in conical shape, and it is quite evident that we will have repeated here what occurred in her right eye. I, therefore, determined to puncture it at once, and evacuated it with Graefe's knife; a drop of pus escaped, the tension of the ball was relieved and the pain very much mitigated. The iris was unchanged in this eye, and there seemed no tendency to prolapse as it did in the right eye.

Jan. 10. Vision very good with the left eye; in the right

eye a dense false membrane has formed in the pupil, and the vision seemed entirely lost.

Jan. 16. Still improving, treatment continued. There has been a general improvement in her condition for several weeks, and she was able to be up and around the ward.

March 13. Vision in her left eye is very good, tension normal and pupil active. There is a small dark discoloration of the sclera at the point where the staphyloma presented, but there is no indrawn cicatrix.

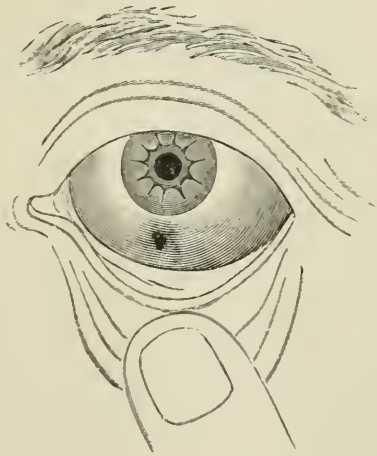


FIG. 7.—Left eye of Laura Coben after recovery. The dark spot in the sclera shows the location of the gumma.

In the right eye there is an extensive discoloration of the sclera below, and marginal opacity of the cornea. The iris is drawn down into the cicatrix, the pupil is closed by a false membrane, the tension is reduced and vision is equal to seeing shadows.

CASE V.—Peter H. Harper, æt. 23 years, colored, occupation, waiter. Physique good and well nourished. He was admitted into the Cincinnati Hospital Jan. 6, 1887.

He states that he contracted syphilis in 1884, and about

four weeks later an eruption appeared on his body. In the spring of 1887 he had a bubo and a specific skin eruption and an attack of iritis of the right eye. Upon admission into the hospital there was well marked plastic iritis with firm posterior synechia. The pupillary area was filled with a dense membrane, and vision was reduced to perception of light.

At the sclero-corneal margin (inner and lower quadrant) is found a swelling the size of a large pea, and below and more externally another, the size of a hemp seed. He has considerable pain and lachrymation, but no marked photophobia. There is great tenderness on pressure, especially in the ciliary region. His entire body and limbs are covered with a pustular eruption uniformly distributed. Gums tender and bleed readily.

He was under specific treatment by inunctions of mercury and potassium iodide until July 15, 1887, when he was discharged.

On the 17th of June the records state that the tumor at the corneo-scleral border had diminished somewhat in size and that the pupil had dilated and the aqueous cleared up considerably.

I saw the patient for the first time on the 16th of July when I made the following notes of the appearance of the eye:

The globe appears slightly shrunken. The outer half of the cornea is slightly vascular, but still transparent enough to allow the iris to be plainly seen. The iris is agglutinated to the lens capsule and the pupil presents a somewhat serrated appearance. The pupillary area is yellowish, as if there was a suppuration going on within the ball. The inner half of the cornea is very vascular, and the iris cannot be seen through it. The elevation of the sclera in the ciliary region begins at the inner side of the superior rectus muscle, and extends inward and downward over the inner half of the eye, and terminates at the outer edge of the insertion of the inferior rectus muscle thus involving one-half of the ciliary zone.

Close to the cornea and marking the beginning of the ciliary elevation is a prominence with very thin outer wall, 2 mm. in

height and 4 mm. in diameter. It is yellowish in color and apparently contains pus. The balance of the elevation is roundish, about 1 mm. in height, and extends from the cornea backward about 8 mm. in breadth. The eye is sensitive to touch and also to ordinary daylight.

He returned to the hospital in a few days with little change in his condition for the better, and as the eye was a constant source of pain and annoyance, it was enucleated Aug. 6 by Dr. Sattler, through whose kindness I have the opportunity of presenting this case.

It was the only case where enucleation was deemed necessary for the comfort of the patient. It is interesting from the great extent of the ciliary staphyloma as it involved over one half of the ciliary zone.

Microscopic Examination.

CASE OF PETER HARPER.

The mass is gummatous in character, consisting of a caseous centre with a more or less distinct capsule surrounding it. The caseous centre is composed of shriveled cells, granular debris, and some fibrous trabeculæ extending inward from capsule. Throughout the caseous mass are scattered numerous pigment granules.

The capsule is fibrous and dense, especially posteriorly, where it seems to be identical with the sclerotic; whilst anteriorly the mass is covered by only a very thin lamina of fibrous tissue and the conjunctiva. At this point the caseous body almost bursts through its capsule. In the fibrous capsule the vessels are undergoing endarteritis obliterans, and are observed in various stages of the process.

All the surrounding tissues have undergone round cell infiltration. This is particularly well marked in the cornea, where the laminæ are more or less separated from one another. The conjunctival epithelium is in a state of proliferation.

In Graefe's Archiv, vol. VIII part 2 (1861) Colberg firs

demonstrates in a specimen furnished by Alfred Graefe the true microscopic character of proliferations in the iris tissue.

In vol. XIII, part 1 of the same (1867) Dr. V. Hippel describes a case where there were two elevations about 1''' below the corneal border. The patient had suffered from syphilis and had had iritis previous to the development of the above mentioned elevations in the ciliary region In the enucleation the sclera ruptured and a yellowish tolerably thick fluid resembling pus escaped.

Barbar-Zürich describes four cases of undoubted involvement of the ciliary by gummatous growths, two of which terminated in phthisis bulbi, and two in resorption of the proliferations, leaving well marked cicatrices.

DeWecker, in DeWecker's Handbuch der Augenheilkunde, Vol. IV, page 516-517, speaks of the rapid manner in which the disease develops. He refers to a patient where in the course of eight days, a growth of the size of a bean developed which pressed one-third of the iris forward against the cornea. The absorption of this growth was very rapid, as it disappeared entirely in three or four weeks under specific treatment.

Dr. Francis Delafield in the transactions of the American Ophthalmological Society, 1871 reports two cases of general syphilitic inflammation of the eye occurring in negroes.

In the first case the man had primary and secondary symptoms and the eye complication followed very rapidly. It was not enucleated for six months after the first evidences of inflammation manifested themselves. There was then an annular staphyloma involving the entire ciliary zone. He says, "The growth was firm and composed of fibres with round and fusiform cells, near its centre it was softer, the cells more numerous and many of them broken down."

In the second case there was a history of syphilis followed by iritis of both eyes, and when he was examined there was found in the left staphyloma of the sclera at the lower and inner margin of the cornea. There were also complete posterior synechiæ of the iris with exudation in the anterior chamber. The eye was enucleated, and the following is taken from the

microscopic report: "That portion of the sclera which formed the staphyloma contained many lymphoid cells between its fibres, and at the apex of the staphyloma the fibres disappeared and nothing but cells could be seen."

In the proceedings of the American Ophthalmological Society for 1874, page 175 is the report of a case of "Syphilitic Gumma in the Ciliary Body," by Dr. Edw. Loring and H. C. Eno. It was in the person of a well developed woman of thirty years of age who had had a chancre five years before. She had the usual secondary and tertiary symptoms. Three years before the enucleation she had an attack of iritis in both eyes. The present attack associated with sudden and very severe pain was very violent, and destroyed the sight of the left eye within a day or two. It was enucleated and a microscopic examination made by Dr. Eno from which the following is taken:

"As seen in this section the episcleral tumor is about $1^1/_2$ millimeters in thickness and extends nearly back to the equator of the eyeball inclosing in its substance the tendon of the rectus externus. The anterior chamber is filled with a mass of yellowish exudation completely blocking up the pupil. The ciliary tumor is of quite firm consistence and yellowish in color. It extends backward to the region of the ora serrata where it is gradually lost in the choroid, which appears to be slightly increased in thickness.

Microscopic examination shows that the episcleral tumor is due to an infiltration of the episcleral tissue with a multitude of round cells.

The cells are distributed between the fibres of the connectissue, and the blood-vessels of this region are enlarged and engorged."

The right eye remained free from any inflammation for two or three weeks after its fellow was attacked and then became painful and sensitive to light. "Four days after the enucleation of the left eye a small circumscribed elevation began to make itself apparent in the line of the insertion of the rectus externus but somewhat closer to the cornea. This hae the appear-

ance of a circumscribed elevation of the subconjunctival tissue, the conjuuctiva proper being but slightly injected just over it." Later on a greyish spongy exudation began to be apparent over that part of the iris opposite the insertion of the externus rectus which in time extended over two-thirds of its surface and projected over its edge into the pupillary space. Vision was reduced to counting fingers at 8 inches.

Under vigorous specific treatment this exudation disappeared so rapidly that within thirty-six hours the anterior chamber was again free and vision greatly improved and the eye made a steady and rapid recovery.

Dr. Seggel of the German Army reports a case of iridochoroiditis gummosa in vol. XI of Archives of Ophthalmology. It occurred in the person of a private in the Bavarian Infantry. He had constitutional syphilis for which he was admitted into the hospital. In a short time the right eye became sensitive to light and painful to pressure and a diagnosis of iritis was made. Within a few days a projection of the sclerotic at the external margin of the cornea was manifest. It was associated with intense photophobia and great tenderness to touch. The iris was now discolored and bound down by many adhesions.

The following descriptions is given: "The scleral projection now presents the following appearance: 4 millimeters from the lateral corneal border, a short distance above the horizontal meridian, the sclerotic projects nearly hemispherically, with a base of three and an elevation of rather more than two millimeters, so that under the movable conjunctiva, though the vascular injection was here most pronounced, the sclerotic is translucent with a light bluish coloration. Despite the great tenderness, it may be demonstrated that the crest of the prominence is not compre sible, and that the resistance is somewhat increased."

The treatment consisted in the use of mercurial inunctions, atropine and cataplasms. The result was most favorable. The growth was rapidly absorbed and the eye returned to perfect vision.

Dr. Conner, of Detroit, in a brochure on syphilitic diseases of the eye on page 9, mentions a case of specific iritis involving both eyes, where there was a swelling at the outer and lower side of the sclero-corneal junction of the right eye. The growth increased in spite of active treatment, and finally enucleation of the globe was necessary.

Although no microscopic examination was made, yet the history of the case and the development of the tumor in the ciliary region all stamp it as belonging to the class of gummata.

In *Archives of Ophthalmology*, 1877, page 318, Dr. A. Alt, of St. Louis, reports a case of an Isolated Gummous Tumor of the Ciliary Body.

"The ciliary body appeared, macroscopically, very much thickened. The microscopic examination revealed the following: Especially the anterior half of this single ciliary body is much thickened by an accumulation of round cells. These round cells show all the peculiarities of the white blood corpuscles. They are more crowded in the centre of the tumor, and are there decaying into fatty detritus. There are no vessels in the new-formation.

The muscular fibres apparently take no active part in the formation of the growth. They are crowded aside by the round cells. In specimens taken from the centre, only a small number of atrophic fibres lie anteriorly to the tumor, (Pl. III, fig. 15) most of them are crowded backward. In specimens taken from the periphery, the number of muscular fibres is increased by those of the centre, which were pushed aside.

There is, besides, purulent iritis and choroiditis and a hæmorrhagic purulent exudation into the vitreous body.

The anotomical condition, united wite the clinical diagnosis, do not allow any doubt as to the gummous nature of the tumor. It, however, is only one symptom of a general specific purulent panophthalmitis.

Theodore Von Schroeder in an inaugural dissertation on syphilitic iritis, 1880, relates a case of a patient 25 years old,

who after specific infection had inflammation of the right eye. There was extensive episcleral injection, and in the upper and outer quadrant a sclerectasia of the size of a small pea.

The eye was extremely painful. Mercurial treatment was carried out but in spite of all the vision faded away and finally the eye became soft and atrophied.

He also records a case in a female aged 20, where after specific manifestations the right eye became involved. There was a sclerectasia directly above the cornea. There was violent pain and photophobia and marked turbidity of the aqueous.

There was a grayish yellow exudation into the anterior chamber which was absorbed. The final result under energetic treatment was a partial recovery of vision.

The most interesting feature of this manifestation of syphilie is the rapidity of its development and its equally rapid absorption. In the cases mentioned be DeWecker, Drs. Loring and Eno and Dr. Seggel the development of the ciliary gumma occurred within from two to eight days. And where resorption took place in favorable cases related by them as well as by others, it was accomplished in a remarkably short time.

In the left eye of Laura Corbin, it is possible that resorption might have taken place under energectic treatment and the eye have been saved to useful vision, but there was severe pain, increased intra-ocular tension and a thinning of the sclera at the point where the gumma was located. I did not think it prudent to risk the action of internal remedies alone.

The paracentesis in the case had the desired effect, and it is quite probable that similiar treatment of the right eye might have saved it also.

We might naturally ask why the ciliary body is not more frequently attacked, especially when we not infrequently see condylomata of the iris. It would seem probable that the ciliary body and choroid may be involved to a limited extent without producing any thinning of the sclera and thus escape observation.

A case like this occurred to my associate Dr. Sattler, where after a violent attack of specific iritis had subsided, there was a bluish spot in the sclera which probably marked the location of a gumma which had escaped observation during the severity of the attack on account of the marked injection of the conjunctival and subconjunctival tissues.

SEVEN CASES OF INSUFFICIENCY OF THE INTERNAL RECTI MUSCLES IN WHICH TENOTOMY OF THE EXTERNI WAS PERFORMED BY DR. C. R. AGNEW.

REPORTED BY DR. D. WEBSTER, NEW YORK.

Clinical contributions to the subject of the treatment of insufficiency of the ocular muscles have not been so plentiful, in the last few years but that reports of cases of the same will be read with some interest. It will be observed that in the seven cases herewith reported the insufficiency of the interni was of a high degree, in five of the cases being no less than 13° or 14° at 20′, and in the other two no less than 3° or 4°. In five of the cases the right externus only was cut, in a fifth the left externus only, and in the remaining case both externi were divided, the interval between the operations being about eight weeks. In three of the cases the refraction was myopic, while in three it was emmetropic or hypermetropic. In one case one eye was myopic, while the other was emmetropic.

One of the most satisfactory results was in a case of myopia, in which, at the last testing there was an over-correction of the insufficiency to the extent of some 10°. For a number of years Dr. Agnew operated for insufficiency somewhat infrequently, first, because of the difficulty of producing exactly the effect desired by the operation then in vogue, and secondly, on account of the too often resulting restriction of the movement of the eyeball toward the side of the cut muscle.

In the later years of his life he performed many tenotomies for insufficiency which I hope to report at some future time.

Case I.—S. A. B. æt. 38 years, physician, came to Dr. C. R.

Agnew, Nov. 28, 1873, on account of a severe asthenopia. He had suffered from "spinal irritation" since the age of eighteen, and for some time past attempts to read or write continuously had produced so much smarting and blurring and so much nervousness that he was compelled to stop. Ophthalmoscopic examination showed that the media and fundus were normal in both eyes.

R. V.=$^{20}/_{XX}$; Hm. $^{1}/_{LX}$.

L. V.=$^{20}/_{XX}$: Emmetropic.

Insufficiency of interni 4° at 20′; 15° at 1′. May 25, 1874. Insufficiency of interni 2°—4° at 20′, 14° at 1′. May 26. Muscular tests give the same results.

Dr. Agnew now divided without anæsthetic the externus of the right eye leaving but a shred of its insertion uncut, and closed the conjunctival wound with a stitch.

May 27. Removed the stitch.

May 28. No inflammatory reaction.

Insufficiency of externi 1° at 20′, and of interni 5° at 1′.

June 1. Insufficiency of interni 4° at 1′, no insufficiency at 20′.

June 11, 1875. Insufficiency of interni 6° at 1′, none at 20′. The cicatrix following the tenotomy became inflamed and painful soon after his return to his practice, and has remained so ever since, and his asthenopia is unrelieved.

Oct. 3, 1880. Insufficiency of interni 3° at 20′ and 16° at 1′.

Nov. 15. Has taken since the last visit, a teaspoonful of Price's glycerine before each meal by Dr. Agnew's advice, and by the advice of Dr. H. D. Noyes, who saw him in consultation, the following:

R	Sodii Bromidi - - -	℥ij
	Ammon. Bromid. - - -	℥i
	Sodæ bicarbonat. - - -	℥ij
	Infus. Columbæ - - -	℥viij

M. S., a teaspoonful in water thrice daily.

During this period he has gained ten pounds in weight, and at first his asthenopic symptoms were relieved, but after a while typical bromism with paresis of limbs, tipsy feeling in

head and partial aphasia set in, and then his asthenopia became as bad as before.

Sept. 17, 1887. The patient is again under Dr. Seguin's care, who refers him again to us to see if the condition of his eyes can be improved. Examination shows normal fundus and media, both eyes. Abduction 6°, adduction 12°, no insufficiency.

R. V.=$^{20}/_{XV}$+; Emmetropic.

L. V.=$^{20}/_{XX}$—; $^{20}/_{XV}$+with—0.25 D. axis 90°.

His reading glasses are, Right+3.50 D., Left+2.75 D. I found on trial that he read more comfortably with Right+3. D., Left+3. D.⌒+0.25 D. axis 180°, and so ordered them. The patient says that Dr. W. A. Hammond has examined him and tells him that he has hyperæmia of the brain. He is uncertain as to whether he was benefited by the tenotomy of his externus.

Case II. Miss T., æt. 36, teacher, was referred to Dr. C. R. Agnew by Dr. John C. Minor, on July 3, 1887. At the age of 15, while at boarding school, she had strained her eyes, and had developed myopia with asthenopia. She got concave glasses, and her asthenopia was partially relieved. At the age of 26 she found that her eyes were losing their power of endurance, and they have grown gradually worse until now she cannot read longer than three minutes, "especially if there is any thought in it."

Ophth: No staphyloma posticum of either eye.

R. V.=$^{7}/_{CC}$; $^{20}/_{XXX}$+with—$^{1}/_{8}$.

L. V.=$^{7}/_{CC}$; $^{20}/_{XXX}$+with—$^{1}/_{8}$.

Insufficiency of interni 4° at 20′, and 20°—25° at 1′.

July 7. Insufficiency of interni 4° at 20′, and 17° at 1′.

July 8. Tenotomy of right externus under ether.

July 10. Patient was kept awake the last two nights by an itching eruption which she calls "the hives," and which was produced by the ether. She complains of homonymous diplopia.

July 11. Insufficiency of externi 10° at 20′; none at 1′.

July 14. Insufficiency of externi 17° at 20′.

July 27. The diplopia is gradually wearing away, but there is still severe pain on reading. Insufficiency of externi 6° at 20′, none at 1′.

July 2, 1875. The patient states that she was troubled with double images for more than two months. She could use her eyes for reading, sewing, etc., with pleasure long before the diplopia passed off. She got rid of the sense of constriction. She can now use her eyes five or six hours a day. She still has double images when she looks to the right. Insufficiency of externi 10° at 20′; no insufficiency at 1′.

Case III. Dr. W. S. had tenotomy of his right externus by Dr. Agnew on May 10th, 1875. Before the operation he had insufficiency of his interni 13° at 20′ and 30° at 1′. Ether was administered for this operation. On the 27th of the following October his insufficiency of the interni was 7° at 20′ and 12° at 1′. His asthenopia, though not cured, was considerably relieved. On April 19th 1876, he had insufficiency of interni 8° at 20′ and 13° at 1′. He was afterwards placed under atropine and fitted with glasses correcting a considerable degree of hypermetropia and with still further improvement.

Case IV. C. L. C., æt. 23, consulted us on January 21, 1876, on account of myopia with severe asthenopia. His near-sightedness was discovered when he was fourteen years old, from his inability to recognize his acquaintances across the street. His father is a clergyman with one defective eye and two of his maternal aunts are near-sighted. He was fitted with glasses by a distinguished ophthalmic surgeon at the age of nineteen.

R. V.$=^{20}/_{LXX}$ with$-^{1}/_{9}$ s.

L. V.$=^{20}/_{L}$ with$-^{1}/_{6.5}\frown-^{1}/_{30}$ c. axis 90°.

Insufficiency of interni 14° at 20′, 29° at 1′.

The ophthalmoscope shows slight staphyloma posticum with pigment changes in the fundus of both eyes.

January 22. Tenotomy of external rectus of left eye, under ether, by Dr. C. R. Agnew.

January 24. Homonymous images at 20′ made to blend by a prism of 5° base out. Has single vision at 2′.

January 26. Homonymous images 4° at 20′.

Feb. 10. Insufficiency of interni 4° at 20′, 20° at 1′.

Feb. 25. R. V.=$^{20}/_{LX}$ with—$^{1}/_{8}$ s.

L. V.=$^{30}/_{L}$ with—$^{1}/_{6.5}$ s. ⌒— $^{1}/_{30}$ c. ax. 90°.

Insufficiency of interni 10° at 20′, 30° at 1′.

March 3. Insufficiency of interni 8° at 20′, 25° at 1′.

April 28. Patient writes—"My eyes are better but the gain has been slow, as I have not been well. I see singly at 1′ or 20′ and nearly so at greater distances, but my eyes are very weak yet."

May 13. Insuf. Ext. 3° at 20′.

Insuf. Int. 4° at 1′.

R. V.=$^{20}/_{XL}$ with—$^{1}/_{9}$ s. ⌒—$^{1}/_{30}$ c. axis. 90°.

L. V.=$^{20}/_{XL}$ with—$^{1}/_{7}$ s. ⌒—$^{1}/_{30}$ c. axis. 90°.

May. 15. Ordered glasses as last above. Patient not since heard from.

Case V. Miss C. L., æt. 26, a teacher of articulation for mute children, consulted us April 15, 1876; for asthenopia. Her eyes had never been very strong, but had given her great trouble in the last two years. V.=$^{20}/_{XXX}$ each, and no improvement with glasses. No lesion of media or fundus.

Insufficiency of interni, 16° at 20′, 23° at 1′.

April 18. Insufficiency of interni 14° at 20′, 19° at 1′.

Tenotomy of left externus under ether.

April 22. Insufficiency of externi 3° at 20′, and of interni 7° at 1′.

May 1. No insufficiency at 20′ nor at 1′.

May 23. Insufficiency of interni 13° at 20′, 16° at 1′.

The left eye got inflamed a week ago, then got better, but the inflammation came on again yesterday, and the eye was so painful last night that she could not sleep.

Ordered atropine and coquilles to be used daily.

May 29. Insufficiency of interni 15° at 20′, and 7° at 1′

June 8. Tenotomy of right externus under ether.

June 12. Homonymous images 3° at 20′. No insufficiency at 1′.

Sept. 14. No insufficiency for near or far as tested by col-

ored glass and prisms. Saw double on looking to the right, at times, during the summer, but in no other direction. Has no diplopia now and asthenopia is relieved.

Case VI. Miss Jeannie E., æt. 17, came complaining of headache, pain in the back of eyes and burning sensation in eyes on reading intently. She had been suffering in this way for four or five years. There was history of hereditary eye troubles.

R. V.=$^{20}/_{xx}$ with—$^{1}/_{12}$ s. ⌒—$^{1}/_{70}$ c. axis 100°.

L. V.=$^{20}/_{xx}$ with—$^{1}/_{10}$ s. ⌒—$^{1}/_{60}$ c. ax. 90°.

Insufficiency of interni, 13° at 20′, 27° at 1′.

Ophthalmoscopically no lesion except slight staphyloma posticum of both eyes.

Dec. 6, 1875. The patient was placed upon atropine and smoked coquilles, the former to be dropped into the eyes night and morning.

June 8, 1876. Insufficiency of interni 10° at 20′, 26° at 1′.

June 16. Tenotomy of right external rectus under ether.

June 26. Insufficiency of externi, 10° at 20′, 4° at 1′.

Patient is troubled with double vision.

June 30. Insufficiency of externi, 8° at 20′; none for the near.

R. V.=$^{20}/_{xx}$ with—$^{1}/_{11}$ s. ⌒—$^{1}/_{48}$ c. axis 90°.

L. V.=$^{20}/_{xx}$ with—$^{1}/_{11}$ s. ⌒—$^{1}/_{60}$ c. axis 45°.

Ordered as last above to wear all the time.

Case VII.—Eugene D., æt. 31, stenographer, greatly overworked, consulted Dr. Agnew on March 22, 1875, for asthenopia. There was well-marked occasional divergent squint of his right eye, but no diplopia, except when brought out by prisms and colored glass.

R. V.=$^{6}/_{cc}$; no improvement with glasses.

L. V.=$^{20}/_{xx}$; E.

April 3. Insufficiency of interni 20° at 20′, and 45° at 1′.

Insufficiency Rt. superior rectus 10°.

The patient was placed under ether and the right external rectus as thoroughly divided as possible. The conjunctival

wound was closed by a stitch and the eyeball strongly rotated inward by a guy to the internal canthus.

April 4. Removed the guy and the conjunctival stitch.

April 12. No lateral deviation.

Insufficiency of right superior rectus 13° at 20′, 10° at 1′.

July 14. R. V.=$^{10}/_{CC}$ with —$^{1}/_{3.5}$; reads J. No. 3 without a glass. Ordered—$^{1}/_{4}$ over right eye and opaque glass over left eye, to use a little every day.

March 21, 1879. For several months past, eyes have become intensely fatigued on use, and this tendency to fatigue is increasing.

Notwithstanding the tired feeling he has been, all along, using his eyes some eighteen hours a day for stenographic purposes.

L. V.=$^{20}/_{XL}$; $^{20}/_{XX}$ with —$^{1}/_{48}$.

Ophthalmoscopic examination shows a hyperæmic optic disk, reddened and blurred. Ordered rest and colored glasses.

March 26. L. V.=$^{20}/_{XXX}$; $^{20}/_{XX}$ with —$^{1}/_{72}$.

Ordered pills of strychnia gr.$^{1}/_{50}$ each; one three times a day.

May 9. After atropine, eight grain solution, had been dropped into both eyes three times,

R. V.=$^{20}/_{CC}$ with —$^{1}/_{4}$.

L. V.=$^{20}/_{XX}$ with —$^{1}/_{72}$.

The patient was not seen again until August 20, 1881, an interval of two years, when,

R. V.=$^{20}/_{CC}$ with —$^{1}/_{4}$.

L. V.=$^{20}/_{C}$; $^{20}/_{XX}$ with —$^{1}/_{36}$.

He complains of "a feeling as though he were using somebody else's eyes," a sudden blurring and then recovery of vision. Ordered —$^{1}/_{36}$ for the distance.

This patient, it will be observed, turned an apparently emmetropic eye into a myopic one from over-work, while under observation. He was one of the most expert stenographers living and his services were greatly in demand. The consequence was, that his good eye was in constant near use during nearly all his waking hours. The case illustrates very well, the de-

velopment of nearsightedness from too steady and prolonged use of the eyes for near work. It also illustrates the fact that an eye amblyopic from disease may have its vision improved by daily exercise of the organ. The sight of the right eye of this patient was increased from $^{6}/_{cc}$ to $^{20}/_{cc}$ in this way.

I consider it extremely probable that the myopia of this patient's right eye was congenital. So far as he could tell, it had been in its present condition since his earliest recollection. If then this patient was born with a highly myopic right eye there was, probably, a tendency, or hereditary predisposition to myopia in the left as well, and this would help to account for the production of myopia from overuse at a mature age.

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

THURSDAY, JUNE 14, 1888.

J. W. HULKE, F.R.S., PRESIDENT, IN THE CHAIR.

From The British Medical Journal.

Paralysis of the Fifth Nerve Associated with Cataract.—DR. W. COLLINS showed a case of paralysis of all parts supplied by the sensory branches of the right fifth nerve; muscles of mastication unaffected. No history of syphilis and no cerebral symptoms. The patient had suffered from severe pain in the anæsthetic parts for eight months and the sight of the right eye had failed. There had been no herpes and no conjunctival or corneal affection whatever. There was diffuse opacity of the right lens; the left eye and side of the face were normal, and vision was good. He considered that the lesion was located somewhere between the root of the nerve in the pons and the subdivision of the Gasserian ganglion. This case conflicted with the views of Snellen and others respecting trophic nerves. Here the lens, non-innervated, and protected from foreign irritants, suffered, while the highly-innervated and anæsthetic cornea retained its pellucidity, notwithstanding eight months habitual exposure.—MR. T. PRIDGIN TEALE mentioned a case of cataract, in which puncture of one lens was followed by suppuration of the globe. The patient died shortly afterwards with aphasia, due to cerebral hæmorrhage, which was not entirely recent but partly resulted from an accident many months previously. He suggested that the disastrous results to the eye might have been the result of the nervous lesion.

Exostosis of Frontal Bone and Orbit with an Intracranial Growth.—DR. EMRYS-JONES mentioned a case, and showed specimens of a large orbital exostosis associated with a myxo-

matous tumor in the anterior lobe of the brain. There had been some epileptiform attacks, the existence of which the patient denied on account of his anxiety to have the growth removed. The attempt at removal had to be abandoned and the patient died five days later from septic meningitis.—Mr. Jonathan Hutchinson had seen several cases of exostosis of the frontal bone. In one case of a young man the exostosis grew into the frontal sinus on the left side and was removed by trephining; later on there grew another exostosis from the right side which was early removed, but septic inflammation and death followed. In another case of a young woman the exostosis was very large, and a long time was spent and many saws were used in attempting to remove the growth, but only with partial success, a raw surface with bony base being left; this suppurated and remained open for twelve months, when further surgical interference led to the shelling out of the remaider of the exostosis, a deep cavity was left, at the bottom of which some mucous material was seen, but the dura mater remained sound; the eye had been previously lost, ultimately the case did well and the wound healed.—The President said these cases pointed to the great risk of interfering when the cranial wall was perforated. He referred to two cases where the inner table only was involved, the roof of the orbit being free, in which removal of the exostosis was quite easy.

Optic Atrophy in Three Brothers (*Smokers*).—Mr. Edgar Browne (Liverpool) read a paper on this subject. In the first patient, aged 40, vision had failed at the age of 27. A diagnosis of tobacco-amblyopia was made. The patient reduced smoking gradually, but continued to chew. Vision had steadily failed to shadows, but the pupils were three millimetres diameter, acted to light, and the patellar reflexes were good. Previously, vision was good; general health always good. Optic discs, typical skim-milk atrophy, with attentuated vessels. He could see a flame or bright reflection from white at periphery of fields. The second patient was aged 33; sight became very bad six months before; he also both smoked and chewed tobacco; he could see a little in twilight. The knee-

jerk was good. Pupils, three millimetres diameter, acted to light. The optic disc showed a general appearance of atrophy; vessels pervious, but rather small. He could see white paper test in lower temporal (right) and lower nasal (left) fields, but not at all centrally. In the third patient vision had failed for two years, patient being aged 23; could read J. 16. This patient discontinued smoking when warned. Pupils sluggish, but acted to light. Peripheral fields for white, both eyes normal; central scotoma for white and red in left eye, for red only in right; color vision with wools good. Optic discs very white and smooth; veins perhaps a little large. The original assumption, that tobacco could cause atrophy had been rather discredited since the significance of axial neuritis had been understood. These cases were closely related to the hereditary optic atrophy of Leber (though occurring rather late), but the term hereditary should not be adopted till our information was much more exact. In all three cases, tobacco was probably the determining cause of the atrophy. In all perception of light was better towards periphery than centre; none had visible neuritis; none had cerebral or spinal symptoms. The father, mother, and sisters had good sight; a collateral relation had suffered. These cases might be taken as types of one group—namely, those in which an axial neuritis being once established tended to spread to the peripheral fibres, involving both sets in the subsequent atrophy. Exactly the opposite occurred in ordinary neuritis, in which the central fibres (and vision) might escape for a time. The following grouping of cases was suggested: 1. Ordinary tobacco-amblyopia, involving only central fibres; transient, and recovery on removal of the cause. 2. A class beginning with central negative scotomata, which progressed downwards till central defect became positive (or nearly so), and axial atrophy might be assumed, peripheral vision being unaffected. The part played by tobacco in these cases required investigation. 3. Cases like those under consideration, where retro-bulbar neuritis, beginning centrally, spread peripherally, giving rise to more or less pronounced atrophy. Here the personal procliv-

ity was show in young persons, members of the same family. If similar groups were found among non-smokers, search would not be required to discover the exciting agent. Beyond these were (4) consecutive atrophy, and (5) atrophy accompanying spinal degeneration. At present the two last groups were well understood, but cases illustrating the second and third groups should be collected.—Mr. Hutchinson mentioned a group of three, consisting of two young males who smoked and the mother of one of them (and aunt of the other) who did not smoke, all affected with optic nerve atrophy. In the case of the woman the inherited predisposition to nerve lesion must have been very strong. Eventually she became quite blind, but had very good health. Perhaps abuse of tea or coffee might have had a share in bringing about this effect; he was sure that they sometimes caused deafness. He thought the Society might investigate the very rare group of women affected with this form of atrophy who did not smoke at all. Mr. Browne had mentioned that his first patient was a total abstainer. This, in his experience, rather led to the production of the atrophy than the reverse; those who indulged in alcohol as well as tobacco were less liable to tobacco atrophy than were abstainers. These cases occurring in families were much more severe, more liable to end in blindness, and much less easily cured than other forms.—Dr. Emrys-Jones mentioned the case of a family of nine children, but only five living, in which two children had atrophy of the optic disc without definite cause, the girl at the age of 17 and the boy aged 9; total blindness ensued.—Dr. Habershon referred to his paper read at a former meeting of the Society, dealing with hereditary cases of optic atrophy; in some a sexual cause appeared to operate.—Mr. Walker thought that great losses of blood and a numerous family in the mother and grandmother might be a cause of optic atrophy in children.—Mr. Browne hoped an investigation, as suggested by Mr. Hutchinson, would be undertaken by the Society. Subjects of tobacco amblyopia had often been drinking heavily; if they left off alcohol and tobacco they did well.

TRANSLATION.

A NEW METHOD OF TRANSPLANTING CORNEAL TISSUE.

BY C. A. VON HIPPEL.

[The interest which the happy results of von Hippel in transplanting corneal tissue have aroused among oculists prompts the translation of an extract from a part of his paper in Graefe's Archives, taken from the *Centralblatt f. prakt. Augenhlk.* This will be the more valuable since certain American publications, sent out with great flourish and in too great a hurry, might be apt to bring discredit to the real achievements of von Hippel.]

Contrary to the opinions of Neelsen and Angeluzzi, the author states positively:

1. That the transplanted flap dies but *very exceptionally.*

2. The nutrition which comes from its periphery is perfectly sufficient to keep it alive. A new-formation of tissue upon its posterior surface forms a disagreeable complication.

3. Even where there is no such formation of tissue, the posterior layers of the flap may get dim, its tissue may swell, and a smaller or larger portion of its epithelium may be cast off.

Peschel, who tried to transplant the cornea of the embryo, was unsuccessful. After shortly speaking of the doubtful method of Martin, the author speaks of Leber's investigations, concerning the current of the fluids in the eyeball, and of the fact demonstrated by him, that a clear cornea can only be expected when Descemet's membrane is intact: He further states, that the implanted Descemet's membrane, on account of the

turning in of its edges, cannot heal together with what remains of Decemet's membrane in the eye operated upon, and from that deduces the rule, that Decemet's membrane must be preserved *in toto*. This idea was made use of by the author in devising partial transplantation of perfectly equal pieces which can be done by the use of the trephine.

It is first necessary to get, by oblique illumination, as exact an idea as possible of the extent of the leucoma in depth, and of the existance of an anterior chamber; furthermore, the author recommends to palpate the cornea carfully with a rubber spatula, after having instilled some cocaine, in order to arrive at some knowledge with regard to the thickness of the different portions of this membrane. It will not always be possible to make the implantation in the centre of the cornea, but where it has to be done excentrically, an iridectomy may, at a later period, complete the success.

The trephine provided with a clock-work, which can be easily set agoing and stopped, (Liebrich's Nachfolger, Giessen, 40 Mark) is so arranged, that by a certain contrivance, it can be prevented from entering too deep into the tissue. In the case operated upon by the author, the thickness of the cornea was one millemetre. The operation is proceeded with in the following manner:

1. Introduction of the speculum; grasping the eyeball on opposite sides with fixation forceps; putting the trephine vertically upon the lencoma, but without pressure, and cutting off the piece which is to be removed. The diameter should not be more than 4 or 4½ mm. This is always followed by hæmorrhage which is stopped by sublimated ice-cold cotton.

2. Removal of the piece of cornea. For this the author uses a strong, straight iris-forceps, with sharp teeth, one branch of which is inserted as deeply as possible into the incision in order to grasp, if possible, the whole thickness of the flap, and stretch it. The removal is done with Graefe's knife. When operating upon the right eye, the autor stands behind the head of the patient. With some training it is possible to get the fundus of the gap pretty smooth, at least sufficiently

so, to allow of the union of the implanted flap. If there are any dim portions left, one should not try to remove them, as not only perforation of the cornea may easily be produced, but also a spontaneous clearing up has been observed. Blood-vessels are not to be dreaded.

3. Excision of a corresponding piece of the whole thickness of a rabbit's cornea. The eye is cocainized. By means of a squint-hook introduced behind the eyeball, it is pressed against the lids as far as possible and fixed in that position. Fixation with forceps alone is not sufficient. If the flap is shifted under the trephine it can not be used. It is, of course, necessary to arrange the trephine so, that it will pierce the whole thickness of the cornea, if there is any iris pigment adherent to the posterior portion of the flap, it must be removed by irrigation with a sterilized 0.6% solution of chloride sodium.

4. Transplantation of the flap to the human eye by means of a rubber spatula—no speculum required. When the hæmorrhage ceases, the flap is laid on the cornea by the side of the defect and slowly shifted into it, taking care to avoid air-bubbles. Finally, a slight pressure is exerted on the flap by means of a spatula, in order to give it a good apposition all over. If the flap protrudes over the level of the cornea it is easily displaced. It is, therefore, best to take young animals with a thin cornea. After the flap has been brought into the proper position it is thinly dusted over with iodoform and the lids are carefully closed, the upper one being lifted over the flap. Both eyes are put under a pressure bandage and remain so for two or three days. After that time the bandage is changed every twenty-four hours. On the sixth day the fellow eye is left unbandaged and the patient allowed to leave his bed. On the eighth to tenth day the eye operated upon is left unprotected.

The following disagreeable accidents may happen: The operator may perforate Descemet's membrane in some place with the trephine. He can then not go on with the operation but he may try it again from 4 to 6 weeks later. It is also best to desist from proceeding with the operation if the position of the

trephine is an oblique one, since this irregularity in the wound cannot be corrected. If the trephine did not enter at least 0.75 mm. deep, the incision is too shallow; this may be corrected by a second application of the instrument. When the operator has grasped too thin a portion of the cornea with the forceps and begun to cut it off, it will be best to allow the wound to heal again. If however Descemet's membrane is perforated while the flap has the correct thickness, the operation may be proceeded with.

One should be very careful not to give the defect thes hape of a funnel. The hæmorrhage has already been spoken of. If the flap is stained with blood, it must be rinsed with a solution of chloride of sodium and meanwhile left lying upon the conjunctiva. If there is any increase of pressure in the anterior chamber and Descemet's membrane is pressed forward into the defect, it is best to puncture the anterior chamber in order to get the flap into a good position.

The following is the process of healing: After 24 hours slight inflammatory changes are seen, the bloodvessels are more injected, the corneal tissue around the flap to the extent of 1 or 2 mm. in width, is dim, slightly swollen and prominent; the flap itself is either perfectly transparent or slightly steamy. The untouched layer of corneal tissue below the flap reflects the light more strongly and if it contained blood-vessels these are more injected. In the course of the first week this injection of the eyeball disappears and the space between the flap and cornea, beginning at the periphery, is gradually obliterated. Neither vasularization nor swelling of the flap occurs. Sometimes small infiltrations are observed near its edge which however disappear rapidly and without leaving a trace. After the third week the process of healing seems macroscopically to be perfect. In 4 cases out of 8 the operation was successful.

The author gained in one case $V = {}^{20}/_{cc}$, in another more than ${}^{20}/_{cc}$ in which fingers had formerly been counted at three and two meters respectively. Even in cases in which the operation is notcrowned by success, the newly formed leucoma is more transparent than the old one was.

To sum up:

1. The possibility of the transplantation of corneal tissue with preservation of its transparency, and the result of a sufficient visual acuity is proven.

2. Even when the leucoma affects the whole thickness of the cornea, the transplantation may be tried with hope of success.

3. Totally adhering and prominent leucomata are to be excepted.

4. The operation is absolutely without danger, causes little suffering, and may surely be performed wherever there is any hope of success.

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THE HARMONIOUS NON-SYMMETRICAL ACTION OF THE OBLIQUE MUSCLES EXPLAINS "BINOCULAR ASTIGMATISM."

BY G. C. SAVAGE, M. D.

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At the meeting of the section of ophthalmology, American Medical Association, in Cincinnati last May, Dr. Culbertson read his paper on "Binocular Astigmatism," which has since been published in the AMERICAN JOURNAL OF OPHTHALMOLOGY, vol. V., No. 5, p. 117. During that meeting I discussed his paper, supposing that what I was saying was being noted by our shorthand reporter for publication in the Journal of the Association, in connection with Dr. C.'s paper. The reporter failed to get any of the discussions of that meeting in a shape worthy of preservation, so that all was lost save to those who heard. I am not sorry on account of the loss of my discussion of Dr. C.'s paper, for the limited time, though kindly extended, was not sufficient for a clear exposition of what he had termed "Binocular Astigmatism."

The phenomena suggesting to him the subject on which he wrote were: imperfect vision, proximal and remote; distortion of a rectangle (3x12 inches) at a distance of one metre or less; and inclination of a level surface, as the floor, all of these being caused by the use, in binocular vision, of cylindrical lenses that had been carefully adjusted in monocular examinations. That these phenomena do occur in some cases of astigmatism has been observed by every ophthalmic surgeon of any experience; but I presume that Dr. C. is almost alone in the practice of changing the axis of the cylindrical glass for one eye (sometimes for both) in order that these phenomena may be made to disappear. That such practice was ever entirely satisfactory is but evidence of the self-adjusting power possessed by eyes, as well as their power of endurance. That lenses so changed would be better than no glasses at all, I can understand. That he ever found the changing of one axis better than the changing of both is strange, for reasons that will be given further on in this paper. That in one case he would have to change the axis of the right glass and in another the axis of the left is susceptible of explanation which will be given further on. That the changing of either axis is bad practice I will be able to prove.

For the phenomena referred to above, observed by many for years, no attempt at an explanation had been published, so far as I know, previous to Dr. Culbertson's paper; yet the true cause of all these phenomena, viz., *the rotation of the eyeballs by the harmonious non-symmetrical action of the oblique muscles* was discovered by myself more than three years ago, which discovery I set forth in a paper read in the Ophthalmic Section of the American Medical Association, at its meeting in Chicago in June, 1887, and published in the Journal of the Association, Nov. 5, 1887. Although that paper occupied more than the allotted time, I regret that I did not refer to these phenomena specifically, as it would have demonstrated better than anything else the correctness of the theory of rotation advocated in it.

There can be but three explanations for these phenomena,

and of these three there can be but one correct. The first (because I shall examine it first) is Dr. Culbertson's theory of rotation of the eyeballs by the recti muscles; the second, Martin's theory of sectional contraction of the ciliary muscles; and the third, my own theory of rotation of the eye-balls by the harmonious non-symmetrical action of the oblique muscles.

1. Dr. Culbertson's theory—what is it? Let me quote from his paper (p. 118): "But it is evident that in proximal vision the interni, the inferior oblique, and the superior and inferior recti muscles must exercise increased force and act in concert." In criticism of this statement I would say that the acting extrinsic muscles of the eyes in near vision are the interni, the inferior recti and the superior oblique, the interni causing the visual axes to converge, the inferior recti causing those axes to point downward toward the page, and the superior oblique preventing the loss of parallelism between the vertical meridians of the corneæ, which would occur if the inferior recti were unopposed in their action. In proximal vision only these muscles act, except in certain cases of astigmatism when, for the betterment of vision, the superior oblique of one eye is made to act too powerfully, rendering it necessary for the inferior oblique of the opposite eye to act correspondingly, in order to prevent double vision. *The naturally vertical meridians must be kept parallel if not vertical, else double vision would result.*

Again (p. 119): "Let the following case illustrate. In binocular proximal vision, suppose that the left inferior oblique fails to act sufficiently to maintain the axis of rotation vertical, and that the inner fibres of left superior rectus inclines said axis at its upper extremity toward the nose; then the rays of light will no longer cut the cornea in its vertical meridian, but toward the temporal side of the should-be vertical plane of the cornea. If the defective axis of the cylinder was at an angle of 180° in remote vision, for proximal vision the axis of the glass will have to be turned upward toward the displaced axis of rotation of the eye-ball, as many degrees as this axis has deviated from the normal vertical perpendicular. If

it be 10° then the angle would be 10° instead of 180° for the cylinder, the scale running from the temporal side. In other words the measure of deviation of the axis of rotation is the number of degree of axis-displacement of the cylinder required in order to cause both sides of our object board to appear parallel."

In criticism let me say: If the language just quoted is correct, the patient, in reading, must have held his book above his head, since contraction of the superior rectus would cause the axis of vision to point upward; or if looking at the rectangle that, too, must have been held above his head. Granting that the doctor intended to say inferior rectus instead of superior, and superior oblique instead of inferior, what would have happened? In either case *parallelism* between the naturally vertical meridians would have been lost, and *double* vision would have resulted, one image, if board was used, being a perfect rectangle as seen by right eye, while the other image would have been a four-sided figure, leaning and narrowed at one end. Moving the axis of his cylinder would have widened the end, but the image would still lean, and vision would still be double. Possibly the confusion of double images would have been so great that the deformity of one image would not have been noticed.

What the doctor names "binocular astigmatism" cannot be caused by what he would term "unbalanced action" of a rectus and oblique muscle of one eye, the action of these muscles in the other eye being perfectly balanced. Can it be caused by the "unbalanced action" of the inferior recti and superior oblique, or, if the card-board is held above the head, the superior recti and inferior oblique of both eyes? If the inferior rectus of right eye is not sufficiently opposed by its superior oblique, the former will so rotate the eye as to make the upper end of the vertical meridian of its cornea (the meridians of the cornea end at corneal margin, therefore I may say "end of meridian") point up and out; if the inferior rectus of the left eye is not sufficiently opposed by its superior oblique, then the former will cause its eye to so rotate as to make the upper end

of its vertical corneal meridian point up and out. This would make the naturally vertical meridians of the corneæ divergent at upper corneal margin and convergent below. Marked double vision would result, the two images of a vertical object, leaning toward each other at their tops. If we could suppose that double vision would not result, the image of the object looked at through the glasses as adjusted in the monocular examinations, if a rectangle, would be narrow at the top and wide at the bottom, a phenomenon not referred to by Dr. Culbertson.

It is clear that the explanation for "binocular astigmatism," as given by Dr. Culbertson, is not correct.

2. Toward the close of his paper (p. 123) Dr. C. says his explanation may not be true, and adds: "Accommodation may have a direct influence in the result, by changing the focus of individual sectors of the crystalline lens," referring to Martin's theory of the sectional contraction of the ciliary muscle.

The fact that "binocular astigmatism" exists to some extent in some cases when all ciliary power has been suspended by atropia or homatropia, is strong proof that sectional ciliary action does not cause it. I am not convinced that sectional ciliary action ever occurs, but I am sure that it never causes "binocular astigmatism."

Let us study, in reference to Martin's theory, a case of simple hypermetropic astignatism, with the emmetropic meridian in right eye at 75°, and that of left eye at 105°. Under suspension of accommodation we find the glasses needed to be +3 cyl. ax., for right eye at 75°, and for left at 105°. If Martin's theory be true, such eyes, when uninfluenced by medicine, have the power of partly correcting their faulty, without changing the refraction of their correct, meridians. To do this that part of the ciliary muscle behind the meridian at 75° in right eye, must not act while every other part must be thrown into action, the maximum of power being exerted by that part behind the meridian at 165°. The same may be said of the left eye substituting 105° for 75° and 15° for

165°. Does this kind of action occur in such eyes? I have never seen the evidence. If it were to occur while the correcting lenses are being worn, distant vision would be more blurred than near vision, but rectangles would have their natural appearance and the floor would not slant. The only thing to be done in such a case would be to give a weaker pair of cylinders (a practice based on Martin's theory) allowing the axes to remain as before.

Again taking the same pair of eyes we may suppose that the ciliary strain at the points corresponding to 90° is just enough to make those meridians emmetropic without affecting the originally emmetropic meridians. Then rotate the cylinders, the one for the right eye from 75° to 90°, and the one for the left eye from 105° to 90° so that they may correspond with the (supposed) newly made emmetropic meridians; and you will find that the part of the cylinder corresponding to 75° in one eye and 105° in the other, has a converging power of .50 dioptres, necessarily focusing in front of the retinæ the rays passing through those meridians. Such a condition would distort and dim objects near and far, whether the positions of the axes of the cylinders remain at 90° or be placed back at 75° and 105°.

Or again we can suppose that the ciliary strain, while making the vertical meridians emmetropic, so acts on the formerly (naturally) emmetropic meridians as to make them myopic—it could not make them hypermetropic. The lenses placed as before would only distort and dim objects still more, which no moving of cylinders could improve.

To me it is clear that ciliary strain, sectional or general, does not cause the phenomena giving rise to the name "binocular astigmatism." That ciliary strain can aggravate the acting cause of "binocular astigmatism" is true.

3. The cause of "binocular astigmatism" is the *harmonious non-symmetrical action of the oblique muscles*, which function was discovered by myself and explained in the paper read in Chicago, already referred to. By the expression "harmonious non-symmetrical action of the oblique muscles" I mean that

the superior oblique of one eye acts with the inferior oblique of the other in such a way as to rotate the eye-bails so as to alway keep the naturally vertical meridians parallel, thus preventing double vision. For instance, the right *superior* oblique by contracting may roll its eye-ball so that the naturally vertical meridian, instead of being allowed to stand at 90°, is made to stand at 75°, and at the same moment the left *inferior* oblique will roll its eye so that its naturally vertical meridian is made to stand at 75°, the two being still parallel though leaning. This peculiar function is exercised in most if not in all cases of astigmatism, before correction by means of lenses, when the best meridian of one or both eyes is somewhere between the vertical and horizontal meridians; and the object of the action is to make the emmetropic meridian approach the vertical, if nearest it, or the horizontal, if nearest it, so as to make vision sharper.

Take a case of simple hypermetropic astigmatism with the best meridian in each eye at 105°, no glass ever having been worn. To sharpen vision the superior oblique of the right and the inferior oblique of the left will revolve their respective eyes so that the emmetropic meridian of each eye will be brought to the vertical, having described an arc of 15°. While doing near work these muscles will hold the emmetropic meridians in their new positions until forced by fatigue to resume a state of rest. This habit of rotation is formed early, and continues throughout the life of the individual, unless a pair of correcting lenses are given. At first, even with the glasses on, the old habit of rotation may continue, and if so, some of the phenomena of "binocular astigmatism" will appear. The rectangle will be but little changed, but the floor will slant from left to right, which phenomenon will continue until the eyes learn that vision is now sharper and easier without than with rotation, at which time the harmonious non-symmetrical action of the oblique muscles will cease.

Again take a case of simple hypermetropic astigmatism, the emmetropic meridian being at 75° in right eye and at 105° in left eye. The inferio r oblique of the right eye can place its

emmetropic meridian at 90°, but at the same moment the superior oblique of the left eye will move its emmetropic meridian from 105° to 120°, the vision being sharpened in the right eye by the rotation, but more blurred in the left eye. During this state of things the mind takes cognizance of the image in the right eye only. Let these muscles become fatigued, and, in a moment the work is shifted from them to the superior oblique of the right eye and the inferior oblique of the left eye, thus placing the best meridian of the right eye at 60° and that of the left at 90°, the sharper image, the one the mind considers, being this time in the left eye. This shifting of labor may occur once or many times during the long continuance of near work. Now a proper cylinder having been given each eye, the axis of one at 75° and that of the other at 105°, the old habit of rotation may continue for a time; if so there will appear some of the phenomena of "binocular astigmatism." With the glasses on, if the eyes are revolved by the inferior oblique of the right and superior oblique of the left eye, the right end of the rectangle will be narrowed, its left border will incline from left to right, and its lower border will slope up from left to right and the floor will slant from right to left. Let the labor be shifted to the superior oblique of the right eye and the inferior oblique of the left, than the left end of the rectangle will be narrowed, the right border will incline from right to left, the lower border will slope up from right to left, and the floor will incline from left to right. In both cases the upper border will be shortened.

Examples could be multiplied, if necessary, for the establishment of the fact that there is a harmonious non-symmetrical action of the oblique muscles which is exercised in many if not in all cases of astigmatism when the best meridians happen not to be vertical or horizontal; and that the rotation of the eye-balls resulting from this action, if continued from habit after the proper glasses have been given, causes the phenomena of "binocular astigmatism."

Every ophthalmic surgeon may produce in his own person

all the phenomena of "binocular astigmatism." His own eyes must be emmetropic naturally or by means of proper glasses; then let him by means of convex cylinders in the back division of his trial frames produce myopic astigmatism in his own eyes, and then with concave cylinders of same power in front division of trial frames, correct his artificial myopic astigmatism. So long as the axes of these cylinders coincide vision proximal (provided there is no presbyopia) and remote will be perfect, the rectangle will be a rectangle still, and the floor will not incline; disturb this relationship and you dim vision, distort the rectangle and incline the floor. To be specific: let the experimenter put a+3 cylinder for each eye in back part of his trial frames with axis of right at 20° and that of left at 160°. He thus produces simple myopic astigmatism in each eye, the emmetropic meridian in his right being at 20° and that of his left at 160°. It is clear that glasses ground after the following formulæ will fully correct this defect; for O. D.—3 cyl. ax. 20°.

" O. S.—3 " " 160°.

Disturb this relationship between the axes of these cylinders and the emmetropic meridians (axes of convex glasses) of the artificially myopic astigmatic eyes, as the relationship would be disturbed by the contraction of the superior oblique of one eye and the inferior oblique of the other, if the astigmatism was not artificial, then the rectangle loses its shape, and the floor slants. Suppose the convex cylinders (those producing the defect) inseparably connected with the eyes, moving with their every motion, hence, subject to the action of the oblique muscles, then the right superior oblique rolling its eye carries the axis of its cylinder from 20° to 180°, and the left inferior oblique likewise carries the axis of its cylinder from 160° to 140°, the axes of the correcting (concave) cylinders still remaining at 20° and 160°. This change would narrow the right end of the rectangle, and slope downward its upper border from left to right, and would make the floor appear to slant from left to right. Or if the inferior oblique of right and superior oblique of left act in like manner, then the

emmetropic meridian of right eye would be at 40° and that of left eye at 180°, the correcting (concave) glasses still having their axes at 20° and 160°. This would narrow the left end of the rectangle, make its upper border slope down from right to left and would cause the floor to slant from right to left.

Again we may produce with the same + 3 cylinders simple myopic astigmatism letting the emmetropic meridians be at 20° in each eye. The correcting glasses would be the — 3 cyl. ax. 20°. Still supposing that the + 3 cylinders are movable with the eye-balls, then the right superior oblique rolling its eye would carry the axis of its cylinder from 20° to 180°, and the left inferior oblique would, in like manner, change the axis of its cylinder from 20° to 180°, the axes of the correcting cylinders still remaining at 20°. This disturbed relationship would develop the following phenomena: rectangle not much altered but possibly a little narrower at left end and upper border on account of changed direction (slight) of right and lower borders; floor slants from left to right.

With the same + 3 cylinders, produce simple myopic astigmatism so that the perfect meridian of right eye shall be at 20° and that of left at 110°. The correcting lenses would be the — 3 cylinders with their axes at 20° and 110° respectively. Still supposing the + cylinders to move with every movement of the eyes, then the right superior oblique, in revolving its eye, would move the axis of its cylinder from 20° to 180°, and the left inferior oblique, in like manner, would move the axis of its cylinder from 110° to 90°, leaving the axes of the correcting lenses at 20° and 160° respectively. With this displacement, by revolution, of the perfect meridians, are developed the following phenomena: the right and left borders of the rectangle lean towards each other at the top thus shortening the upper border, lower border possibly a little curved, the convexity looking up, and the floor a little curved in same way.

These experiments can be multiplied indefinitely, each time

some of the many interesting phenomena of "binocular astigmatism" showing themselves.

Experiments as to simple hypermetropic astigmatism may be performed by making the — 3 cylinders take the place of the + 3 cylinders and vice versa, in the experiments just noted. I had intended giving the details of fourteen experiments, but my paper is growing too long.

It is interesting to notice that, in those experiments in which a disturbance of the true relationship of the axes of the correcting lenses and the axes of the astigmatic-producing lenses (the emmetropic meridians) brings about a narrowed condition of the right end of a rectangle and a slanting condition of the floor from left to right, by making the axes af the right lenses only coincide again, the floor is made almost level but the right end of rectangle remains narrowed; while, by making the axes of the left lenses only coincide, the floor is leveled and the ends of the rectangle appear equally wide. This corresponds with what Dr. Culberton observed on moving only one lens in his recorded cases (the first part of my observation above noted he did not record). If the left end of the rectangle is the narrowed one, and the floor slants from right to left, then the moving of the right cylinder in the proper direction corrects these appearances. But by moving the right cylinder only when the left end of the rectangle is narrowed, or the left cylinder only when the right end of rectangle is narrowed, in order to make both ends equally wide, we do not obtain a perfectly formed rectangle. If Dr. Culbertson had pressed his inquiries his patients would have said: "While the ends of the rectangle are now of equal width, the upper margin is shortened by the right and left margins leaning slightly towards each other at the top." To have corrected the rectangle perfectly he should have moved both cylinders in the same direction and through the same are, so as to make the axes of the correcting lenses and the rotated emmetropic meridians coincide.

If what I have taught in this paper is correct—that it is correct any ophthalmic surgeon may soon convince himself by

thought and experiment—Dr. Culbertson's practice of changing the axis of one cylinder for the correction of "binocular astigmatism" is erroneous, as would be the practice of changing the axes of both cylinders. Such glasses would be better than none, but the eyes would have to continue to rotate, however with better effect, for the rotation now gives perfect vision, whereas before the glasses were given there was only an approach to perfection of vision. For example, by monocular tests it is found that the natural location of the emmetropic meridian of the right eye is at 20° and that of the left is at 160°; and the correcting lenses are placed in the trial frames accordingly. In binocular vision, if the old habit of rotation is kept up, the left superior oblique may at once roll its eye so that its best meridian stands at 180°; and at the same moment the right inferior oblique, acting in harmony with the left superior oblique, must roll its eye so that its best meridian is moved from 20° to 40°. In this state of things the left end of the rectangle is narrowed and the floor slants from right to left. On turning the right correcting cylinder from 20° to 40° so that it may coincide with the emmetropic meridian in its new position, the floor is made level and the two ends of the rectangle appear of equal width (as said before the upper margin of rectangle is shortened,) effects, as to rectangle, that cannot be gained by changing the position of left cylinder only, from 160° to 180°, so that it might coincide with the best meridian of the left eye in its new position. Then with the axis of left cylinder at 160°, as determined in the monocular test, and with axis of right cylinder changed from 20° (point determined in the monocular test) to 40° (point to which the emmetropic meridian has been rotated), while the superior oblique of the left and the inferior oblique of the right eye continue their harmonious non-symmetrical action, there is absolutely perfect vision in the right eye but blurred vision in the left. Let this pair of muscles become fatigued, then they relax their straining power and the eyes roll back into the position of rest (naturally vertical meridians vertical), so that the emmetropic meridian of the left eye comes again to its natural

position (160°,) exactly coinciding with the axis of its correcting cylinder; and the emmetropic meridian of the right moves from 40°, the point to which the axis of its cylinder had been changed, back to 20°, its natural position. During the continuance of this rest there is perfect vision, proximal and remote in the left eye, but blurred vision in the right. But in this state of rest of the oblique muscles, the floor is made to slant from left to right and the right end of the rectangle is narrowed, due to the changed position of axis of right cylinder, so that vision is not so comfortable; and in a short time the originally acting muscles resume their work. This process must be repeated so long as such glasses are woru. Without the glasses the rotation must be through a greater arc, but the one pr. of obliques "spells" the other; with the glasses all the rotation is accomplished with one pair but the arc of rotation is greatly lessened, therefore these glasses may be more comfortable than none.

In the example just given, if the axes of both cylinders had been changed so that the axis of the left would have been at 180° while that of the right cylinder stood at 40°, the points to which the emmetropic meridians had rotated, there would then have been perfect vision in both eyes, the floor being level and the rectangle perfect (not narrowed at the top as it was when only the axis of the right cylinder was changed). With the two axes thus changed the price of perfect sight is tonic contraction of the superior oblique of the left eye and the inferior oblique of the right; but the degree of contraction being less—a smaller arc to be described then when, without glasses, one pair of obliques would shift the labor to the other—than that to which they had been accustomed, they may bear this strain with some degree of comfort.

The correct practice in all cases of astigmatism is to give the fully correcting lens, and to place its axis so that it will coincide with the best meridian in its natural position, which can always be found in careful monocular examinations with accommodation suspended. There will be no tendency to rotate, the habit of rotation never having been formd, if the axes

of the cylinders are needed at 90° or 180°. In some cases, the emmetropic meridians not being vertical or horizontal, the habit of rotation is broken at once on commencing the use of glasses, and no "binocular astigmatism" is noticed; but in other cases the habit of rotation continues from a few hours to a few days, "binocular astigmatism" necessarily resulting. The disposition to rotate is aggravated by accommodation, hence in rebellious cases either direct the patient to voluntarily abstain from "near work," or else suspend his accommodation with atropia for a few days. In all cases the phenomena of "binocular astigmatism" will pass away in a longer or shorter time, if the axes of the cylinders have been properly placed; for the eyes will learn that there is now no longer any need for rotation—that rotation now makes vision worse and not better. To determine the position of the axis of the cylinder is the most difficult part of tne work of refraction, and always requires patience and time. I devote from two to three consecutive hours to every case of astigmatism, and examine each eye separately, and in all persons under 50 years of age I fully suspend the accommodation by means of homatropia.

THE REMOVAL OF CHALAZIA AFTER THE METHOD OF DR. AGNEW.

BY J. MORRISON RAY, M. D.,

Visiting Surgeon Eye and Ear Departments of the Sts. Mary and Elizabeth and the Louisville City Hospitals; Formerly House Surgeon Manhattan Eye and Ear Hospital New York.

The operation in vogue for the removal of chalazia is by incision upon the conjunctival or skin surface of the lid. This is the method described in all text-books at my command. Authors differ somewhat upon the liability of these growths to recurrence and upon the question of their anatomical structure. For instance, Mackenzie, (1855), says they are uncysted; Nettleship, (1883), maintains that there is no cyst wall; Swanzy, (1884), asserts that the sac of the tumor consists of the walls of the gland. This is also the opinon of Soelberg Wells, Juler, Noyes, Stellwag and Carter.

Fuchs describes the mechanism of their formation as follows: "A disturbance in the nutrition of the Meibomian gland excites a chronic inflammation of the connective tissue around the gland, which leads to an infiltration of the latter with small cells. By a coalescence of several groups of cells there results a nodule which consists of granulation tissue with giant cells. Swanzy states that they are liable to return, especially when not thoroughly evacuated. Nettleship asserts that they never recur. It is the experience of every one at times to see a recurrence, unless the growth be enucleated entire through the skin surface. Under such a method of removal the sac of the growth which is the dilated gland wall is gotten rid of, and thus the Meibomian secretion is checked.

All authorities advise removal of the ordinary form of chalazia through the conjunctival incision. This incision is gener-

ally an enlargement of an existing sinus which leads into the tumor, but which is too small to permit the escape of the jelly like contents. This incision into the conjunctiva leaves a linear scar, which, if situated close to either extremity of the lid or far back toward the retro-tarsal fold, gives rise to no trouble, but if it be close to the free edge and near the center of the ciliary margin, it may by friction upon the cornea give rise to annoying and unremedial irritation, or changes in the corneal epithelium. The only reference I find to the method employed by the late Dr. Agnew, is an interpolation by the editor of the last American edition of Soelberg-Wells' text-book, page 90. Dr. Bull says: "It is better in all cases where the tumor is not too large or too far removed from the ciliary margin, to open the lid with a narrow knife along the ciliary margin, carrying the point of the knife well into the tumor. Then the contents can be squeezed out between the thumb and finger or a small spoon can be introduced through the wound and the contents evacuated. This avoids leaving a scar on the external or internal surface of the lid." It has been the custom at the Manhattan Eye and Ear Hospital in the service of Dr. Agnew to remove chalazia of the upper lid by an incision along the ciliary margin. The operation is there credited as original with Dr. Agnew. His method is as follows: Grasp the lid firmly between the thumb and index finger and slightly evert the edge, with a Graefe or Beer's knife an incision is made well into the growth; the contents are squeezed out or a strabismus hook or Daviel spoon is introduced and the jelly-like material thoroughly scooped out. The cavity rapidly fills with blood, but under frequent applications of hot water in a few days the blood is absorbed and the swelling subsides, leaving no vestige of its original presence and no scar to mark the site of its removal. Dr. Agnew claimed that when the enlargement was in the lower lid the p.ocedure did not answer so well as the incision through the conjunctiva, and that there was not the same objections to a scar in this locality as pertained to the upper lid. For the past three years it has been my routine practice in all cases to remove these tumors

after this method. In private and hospital practice I have removed about thirty and in one case only has there been a recurrence coming under my notice.

My way of operating differs from the original in the following particulars. The lid corresponding to the seat of the growth is firmly grasped between the thumb and forefinger, and by pressure a drop of the jelly-like contents will be forced to present itself from the mouth of one or more of the Meibomian ducts. Thus finding the opening of the obstructed gland the needle of a hypodermic syringe charged with a few drops of a 4 % solution of cocaine is forced into the mouth of the duct and passed into the substance of the tumor and a few drops left in it and also in the track of the needle in withdrawing. Cocaine is also instilled into the eye to allay the irritation from the finger in contact with the globe. In three minutes again grasping the tumor between the fingers an incision is made along the lid margin with a Graefe knife following the course taken by the hypodermic needle; an incision twice the width of the knife blade is made well into the substance of the cyst, a small sharp-edged curette is introduced and the contents thoroughly broken up and removed. With a lachrymal syringe the cavity thus left is thorougly irrigated with a solution of the bichloride (1-2000). After this procedure the cavity slightly fills but never to its original capacity with blood. A hot bichloride solution as a wash for a few days removes every trace of the original protrusion. When the growth is in the lower lid the same procedure is instituted, and when making the incision I carry the knife through the tumor making a small counter opening below on the conjunctival surface. By this opening the bichloride solution passes through, and the cavity is thus left in the best condition for drainage. In two instances I have removed these unsightly growths from timid subjects without pain,after they had refused the more formidable operation by incision through the conjunctiva at the hands of other surgeons. In the treatment of styes the same procedure may be successfully applied, the use of the curette only being dispensed with.

A CASE OF INSUFFICIENCY OF THE INTERNI WITH PROGRESSIVE MYOPIA IN WHICH DR. C. R. AGNEW PERFORMED A TENOTOMY OF AN EXTERNUS.

BY DAVID WEBSTER, M. D., NEW YORK.

Frank S., eighteen years of age, consulted Dr. C. R. Agnew and myself on May 14, 1877, on account of a severe and persistent asthenopia. He was "a blonde with rather soft flesh," and had been studying nine or ten hours a day.

Without glasses his vision was $^{16}/_{C}$ each eye; with $-^{1}/_{13}$ the vision of each eye was $^{20}/_{XX}$. Examination with the ophthalmoscope revealed no staphyloma posticum. A solution of sulphate of atropia, four grains to the ounce, was ordered to be dropped into both eyes thrice daily, and medium smoked coquilles were ordered to protect his eyes from the light.

May 21. The accommodation being entirely done away with by the mydriatic, the vision and refraction were found the same as before, namely, $^{20}/_{XX}$ with $-^{1}/_{13}$ each eye.

June 5. The eyes having recovered their power of accommodation it was found that the patient could see $^{20}/_{XX}$ with $-^{1}/_{14}$ over both eyes at once. Glasses $-^{1}/_{14}$ were ordered for distant vision, and the patient was directed to do his reading with or without them, as he should find most comfortable.

Mr. S. did not appear again until October 30, 1878, when his eyes having again partially given out from overwork and evening use, Dr. Agnew advised him to abandon all use of his eyes for study at night, and to spend his evenings exercising in the gymnasium.

Dec. 5, 1879. Mr. S. is now wearing glasses $-^{1}/_{11}$ with which he has very imperfect distant vision.

The vision of each of his eyes is $^{20}/_{XX}$ with $-^{1}/_{8}$, the myopia of both eyes having increased in about two and a half years from $^{1}/_{13}$ to $^{1}/_{8}$. Still, there is no staphyloma posticum in the right eye, and only a narrow crescent in the left.

April 56, 1882. Mr. S. states that he went to London in 1880, and consulted Dr. Liebreich, who gave him $-^{1}/_{20}$ s. $\frown$ prism $3^{1}/_{2}°$ for both eyes. He improved very much while knocking about, and got to reading four or five hours a day. He came back to New Jersey and returned to college, but his eyes soon began to trouble him again. He consulted Dr. Knapp, who said he had conjunctivitis, and gave him washes of alum, zinc, etc.

He went to London again in the summer of 1881 and again consulted Dr. Liebreich. The latter gave him various washes for his conjunctivitis and prisms, $5^{1}/_{2}°$ base toward the nose, for both eyes.

Mr. S. now complains of a feeling of irritation in his lids, causing him to "blink." He cannot read much without pain, but his eyes vary very much. He has insufficiency of his interni 16° at 20′, and 18° at 1′. He has lately consulted Dr. Knapp again who suggests tenotomy of an externus.

May 2, 1882. Dr. Agnew performed a tenotomy of the right external rectus, through a horizontal wound in the conjunctiva, the patient being under ether. The conjunctival wound was closed by a stitch.

May 10. Mr. S. says his eyes have not felt so well for a year and a half as they have since the operation, notwithstanding a homonymous diplopia which he has experienced since the tenotomy. The images are about three feet apart at a distance of twenty feet.

May 16. Insufficiency of externi 13° at 20′.

May 19. The patient can see singly for a few moments without prisms at twenty feet.

May 25. Mr. S. has recovered binocular single vision for all distances.

The vision of each eye is $^{20}/_{XX}$ with $-^{1}/_{7}$.

May 31. Ordered $-^{1}/_{16}$ for constant and $-^{1}/_{7}$ for occasional use.

Aug. 14, 1883. Mr. S. reports that his eyes are much better than before the operation. He says there was a steady improvement for six or seven months, and that the symptoms for which the tenotomy was performed seem to be permanently relieved.

A PECULIAR DERMOID TUMOR OF THE CONJUNCTIVA.

BY H. V. WUERDEMANN, M. D.
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Dermoid tumors of the conjunctiva are not very rare, and are usually situated at the limbus, appearing partly on the cornea and partly on the sclerotic. One or two short hairs may protrude. The case below is unusual in the situation of the growth and in the character of its hirsute appendages.

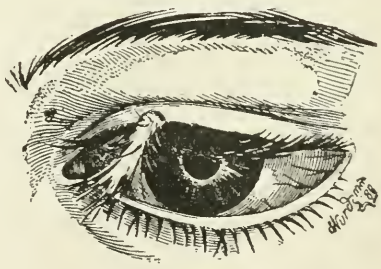


Fig. 8.

July 18, 1888, W. S. H., white, male, æt. 59, messenger in U. S. service, consulted me for conjunctivitis which was relieved. At first sight there seemed to be a yellowish white feather growing from the edge of the upper lid, taking the same direction as the cilia. Upon examination the excrescence

was recognized as a small dermoid tumor of the conjunctiva, about the size of a grain of wheat. On everting the lid, the growth was seen to extend back 4 mm. from the edge of the lid. It also projected externally for 2 mm. The hirsute growth was $^3/_4$ of an inch (nearly 2 cm.) in length. It was very fine and appeared of a woody nature.

The patient refused to have the tumor excised, as he was proud of the appendage and believed it to be a feather.

He informed me that the hair grew at least one inch (25.cm.) in six weeks after being pulled out; the tumor had existed for ten years.

By microscopic examination the hair from the tumor appeared similar to fœtal wool. It was probably a product of retrograde metamorphosis with subdivision of one or two cilia. The illustration, Fig. 9, shows a portion of the outgrowth with one of the cilia.

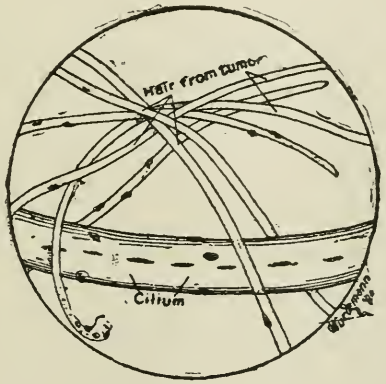


FIG. 9.

ABSTRACT OF THE PROCEEDINGS OF THE SEVENTH INTERNATIONAL CONGRESS OF OPHTHALMOLOGY HELD AT HEIDELBERG, AUGUST 8 TO 11 1888.

REPORTED BY DR. L. HOWE, BUFFALO, N. Y.

The first session Wednesday morning was called to order by Prof. Donders of Utrecht, in the name of the committee on organization. He welcomed the members cordially, who, to the number of more than two hundred had assembled from every country of Europe, from the United States, South America, Australia, Egypt, and Japan.

Incidentally he referred to Helmholtz, who was present, and at the name of one who had done so much for ophthalmology, the members arose and applauded in testimony of their respect and esteem.

After further welcomes by Becker in the name of the Government of Baden, Arnold, for the University of Heidelberg, Herr Wilkens, the mayor, for the city, the following officers of the permanent organization were elected:

President, Donders, of Utrecht; Vice-President, Zehender, of Rostock; General Secretaries, Stilling, of Strassburg, and Hess, of Mayence; Recording Secretaries, Valude, of Paris, Brettauer, of Triest, and Swanzy, of Dublin.

Javal (Paris), made the first communication, giving the history of the improvements in the ophthalmometer, and described certain elaboration of details introduced since his last publication. Still he does not yet consider the difficulties are all overcome.

Dufour (Lausanne), enquired as to the practical utility of the instrument in the present form.

Javal said, that occasional cases undoubtedly existed in which the astigmatism of the lens was so great as seriously to complicate the results of corneal measurement. Two such examples were detailed. With certain corrections, however, the figures obtained could usually be relied upon,although in young subjects a considerable apparent astigmatism of the cornea is often neutralized practically by compensating unequal changes in the lens.

Further observations on the subject were made by Pflueger, of Berne. Sattler, of Prague, Schoen, of Leipzig, and Schneller, of Danzig.

Graefe (Halle).—"On the action of the internal recti in associated lateral movements, and in those of accommodation and convergence." He described a case in which the ability to converge on both sides persisted while other associated movements of the internal recti were lost. Two similar cases from the literature were cited, and he concluded, that there were two distinct centres in the brain, presiding respectively over accommodation and convergence.

Reymond (Turin).—Adjunct reporter on the same subject. Dwelt at length upon this same relation between convergence and accommodation, and expressed the opinion that when binocular vision was not possible, the deviating eye tended rather to diverge, that being its most natural position.

Landolt (Paris), concurred in the opinion of Graefe, citing cases of hysterical contractions of the internal recti.

Landolt (Paris).—"On the cause of Strabismus." Strabismus exists whenever the two eyes are not simultaneously directed at a fixed point. The eyes are indeed held in position by the act of binocular vision. Therefore, the absence of binocular vision and of accommodation predisposes to strabismus. Among the principal causes of strabismus there should be mentioned first the connection between convergence and accommodation.

Landolt (Paris).—"Treatment of Strabismus." After a thorough examination of the vision, accommodative power, degree of strabismus, field of fixation, etc., one can form an idea as to

the advantage to be gained from stereoscopic exercises, mydriatics and convex glasses. These are of advantage only in recent or moderately advancèd cases. Complete tenotomy, especially when combined with sutures, is advisable only where the deviation is great, but a moderate tenotomy can decidedly assist the action of the antagonistic muscle. Whenever the strabismus is due to any loss of power of a muscle, as is frequently the case, advancement of that should be combined with tenotomy of the opponent.

DeWecker (Paris), insisted upon the importance of the tendinous fibres given off by the muscle, and considered that the success or failure of the operation depended upon the properly altered position of Tenon's capsule.

Schweigger (Berlin), said he usually preferred the advancement to tenotomy for the reason that it was then easier to graduate the degree of correction.

Knapp (New York), referred to statistics he had already published relating to this subject, and said that in a large number of cases he employed deWecker's method of capsular advancement. It was modified, however, as necessary by the sutures in the muscle, capsule or even the episcleral tissue, and by removing them gradually as appeared advisable.

After further discussion the subject was closed by the reply of Landolt to the various criticisms offered.

Stilling (Strassburg).—"On the relation between the formation of the skull and the formation of the eye." Gave a résumé of the results of measurements, already published, tending to show that a low, broad orbit accompanied myopia, and a narrow high one accompanied hypermetropia.

Schmidt-Rimpler (Marburg), reported the measurements made in seventy-five cases in which no such relation existed and

Cohn (Breslau), concurred in the same opinion adverse to the theory, while

Weiss (Mannheim), had observed several times the concordance between the two.

Morning Session August 9.

Gayet (Lyons), "On the operation of cataract," gave a résumé of his opinions in the form of nineteen distinct propositions. The statements which apparently called for criticism were :

No. 8. That the iridectomy is unnecessary and rarely useful.

No. 9. The opening of the capsule should be made at the same time as the corneal incision and with the knife.

No. 12. The anterior chamber can be washed out with sterilized water or an antiseptic if desired.

No. 15. Neither atropine nor eserine are absolutely indicated or contra-indicated.

No. 19. Secondary operations are uncertain and dangerous.

Schweigger (Berlin),referred to the imperfections of statistics based on insufficient data. The use of cocaine, improvements in operative methods and antiseptics enable us now to return more toward flap incision and also to avoid the iridectomy. Upon the latter point he dwelt at considerable length, giving statistics to fortify the position taken.

Discussion.

DeWecker (Paris), thought the Graefe knife should be retained in preference to all others. Also thought eserine was advantageous and so harmless as to be with safety injected into the anterior chamber.

Wicherkiewicz (Posen), said he never used atropine before operation, and to that fact he attributed this small proportion of cases where prolapse occurred.

Critchett (London), advised the use of the fingers instead of a blepherostat. As to the iridectomy, he considered the advantage of safety, thus gained, so much greater than all else without it, as to leave to him no question of choice. At least he thought any oculist who might be unfortunate enough to have cataract himself, would prefer in its removal, the method with the iridectomy.

Galezowski (Paris), said he made the puncture and counter-puncture from 2 to $2^1/_2$ millimetres in the sclero-corneal margin. Also that he kept the eye closed, if all went well for six days after the operation.

Laqueur (Strassburg), called attention to the overuse of cocaine as denuding the cornea of the epithelium in spots, and rendering the eye liable to complicating processes.

Haase (Hamburg), asked of Schweigger how long he kept the eye closed after operation.

Schweigger.—Ordinarily till the third day.

Hiemel (Leipzig), descrides a procedure by which he made a circular opening with a needle in the centre of the capsule, after that the flap incision is made and the lens is then ready to escape.

Chibret (Clermont-Ferrand) showed the disadvantage of an excess of cocaine as illustrated by the mistake of a druggist. As for iridectomy, he avoided that, excepting snipping off whatever part protruded after the incision.

Graefe (Halle), could not allow the attacks on atropine to pass without a protest. He used it invariably, and never had observed any injurious results.

Knapp, after giving his more recent statistics, said in those cases he used a small knife, made the incision very near the periphery, and then omitted the iridectomy. As soon as the lens was expelled he washed out the anterior chamber with a sublimate solution 1 to 10,000. If the vision did not come up to $^2/_5$ or $^2/_3$, a secondary operation on the capsule was made.

Meyer (Paris) called attention to the dangers of the iris remaining in the wound, as is frequent when iridectomy is omitted, and cited the opinion of von Graefe on the point.

De Wecker objected that Becker had discovered pieces of iris caught in the wound on nearly all the eyes he had made sections of, even after the iridectomy for extraction had been performed.

Knapp, in closing the discussion, said, that so important a question could not be decided then, but he thought the princi-

pal advocates for iridectomy were among those least acquainted with the method of extraction without it.

Afternoon Session.—August 9.

Jessop (London), "On the physiological action of the intra-ocular muscles." Related a long series of experiments which led to the conclusion that irritation of the short ciliary nerves produces contraction of the iris (myosis) and irritation of the long ciliary nerves produce the contrary effect.

Coccius (Leipzig), "On the tensor action of the choroid." Described the appearance presented by the posterior capsule during accommodation. This showed an almost vibratory motion of the lens which was particularly noticeable in cases where the vitreous was partly fluid.

De Wecker, "On the treatment of persistent lachrymation." Pointed out the difference in location and possible function between the orbital and palpebral lachrymal glands. It was the latter which he had been accustomed to remove by forcibly everting the upper lid, dissecting up the conjunctiva, drawing the gland foaward with forceps and removing it. Little or no after-treatment was necessary and in a series of 25 cases, the results were exceedingly satisfactory.

Discussion.

Gruening (New York), cited a case to show, how persistent lachyrymation could depend entirely upon some slight obstruction in the nose, and thought the nares should always be brought into a healthy condition before any operative procedure was resorted to.

Eversbusch (Erlangen), had recently removed the orbital lachrymal gland for the same purpose, not from the conjunctival surface, but through an incision in the fronto palpebral fold.

Cohn (Breslau), "On intra-ocular photography." Attention was first called to a simplified form of the magnesium light, and several photographs shown of the lids, cornea and iris

taken by means of it. He considered the difficulties in illuminating the interior of the human eye, and viewing it at the same time, almost insurmountable, but presented two photographs of the fundus of the artificial eye of Perrin which after several trials he had obtained.

Discussion.

Howe (Buffalo), proved that greater part of these difficulties had been overcome by presenting a photograph which showed the details of the fundus. The method of rendering the plate sensitive to the reflection and also the apparatus used had been described by himself and Dr. Starr a year previous, and he hoped, in the future, photographs might be obtained perfectly well defined and free from the corneal reflex which thus far persisted as a white patch.

Knapp, described a method of instantaneous illumination which he thought should facilitate the precedure.

Galezowski (Paris), detailed the attempts he had made in the same direction, but thus far he had been unable to obtain any recognizable picture of the fundus.

Javal (Paris), pointed out, how the instantaneous photography would be used in ophthalmometry, giving results which could be measured to millimetres.

Chibret asked if the difficulties of the corneal reflex would not be obviated by means of a Nichols prism, and,

Parent (Paris), replied that he also had attempted intraocular photography, and had not succeeded in obtaining any satisfactory results.

Crainicean (Bucharest) gave "statistics relating to an examination of 8000 children" which corresponded in general with similar figures already published.

Discussion.

Priestly-Smith (Birmingham), said that in spite of our statistics, and what they prove, it is lamentable that so little

notice is taken of them in England and elsewhere by those who have charge of the pupils.

Duerr (Hanover), "On megalophthalmia." He had dissected several such eyes, finding the superior oblique more oblique than it should be, and pressed tightly onto, or even into the sclerotic.

Morning Session—August 10.

Glaucoma.

Dr. Priestley Smith formulated our knowledge of the subject in nine clearly defined propositions, which were already too well condensed to admit of abridgment without mutilation.

Definition of Glaucoma.—An excess of pressure within the eye, plus the causes and the consequences of that excess. Pressure is an essential factor. A glaucoma without increased tension is probably a glaucoma examined during the intermissions of increased tension.

The pressure of the intraocular fluids is determined by 3 conditions:

a. The condition of the secreting organs,

b. The condition of the outlets,

c. The condition of the fluids themselves.

The aqueous and vitreous fluids are secreted by the ciliary portion of the uveal tract. The aqueous escapes at the angle of the anterior chamber (filtration angle.) The vitreous fluid escapes at the papilla, very slowly as compared with the aqueous. Any surplus fluid in the vitreous can pass easily, in the healthy eye, into the aqueous chamber. The condition of the papilla cannot have much influence on the intraocular pressure. An albuminous fluid escapes from the anterior chamber much less rapidly than a normal salt-solution under the same pressure.

The chief factors which can raise the intraocular pressure are therefore: *a.* hypersecretion by the cilliary processes; *b.* obstruction of the filtration angle; *c.* serosity of the fluids.

Hypersecretion is sometimes the exciting cause of the attack, but the glaucoma-process cannot be explained by the hypothesis of a persistent hypersecretion.

Obstruction at the filtration angle is present in most cases of glaucoma; the angle is compressed or closed. Experiment proves that, when the iris-base is pushed forwards, filtration is greatly retarded. It is true that the filtration angle is sometimes closed in eyes which have no glaucoma, but in such eyes there are other changes which render glaucoma an impossibility; the fluid escapes by abnormal outlets, or it is no longer secreted.

Serosity of the fluids is present in many forms of glaucoma. It is a very important factor in the secondary glaucoma of serous iritis and kerato-iritis; in these cases the filtration angle is widely open and the chamber deep.

In most forms of glaucoma the filtration angle is closed. What are the antecedent changes? When they are invisible, we call the glaucoma "primary"; when they are visible, we call it "secondary."

In certain forms of secondary glaucoma we can see the manner in which the filtration angle is closed. Examples: 1. The lens is injured; it swells and pushes the iris against the cornea. 2. The lens falls into the anterior chamber, and occludes the pupil from in front; the aqueous, imprisoned behind the iris drives it forward against the cornea around the margin of the lens. 3. The entire pupil-margin adheres to the lens; the fluid imprisoned in the posterior aqueous chamber pushes the iris against the cornea. In every form of secondary glaucoma, except those in which the aqueous chamber is distended by serous fluid, the iris-base is found on dissection to be pushed forwards against the cornea.

In primary glaucoma of recent date dissection shows the iris-base pushed forwards by the swollen ciliary processes and in many cases the processes are themselves pushed forward by the lens and zonula.

The chief predisposing cause is an insufficient circumlental

space. Thus the liability to glaucoma increases with age, because the lens grows larger as life advances. Again, the liability is greater in the hyperopic eye, because the ciliary muscle and processes are more prominent in the direction of the lens. Again, a small cornea appears to predispose to primary glaucoma: in 227 persons measured with a special keratometer the average horizontal diameter of the cornea was 11.52 mm; in 52 persons suffering from primary glaucoma in one or both eyes it was 11.02 mm. A cornea measuring 10.5 mm. or less is exceptional; among the unaffected persons it was found in about 4 per cent, among the affected persons in 31 per cent. It is at present uncertain whether the small cornea of such eyes is a congenital peculiarity or a senile change. (The investigation is not yet completed.)

Senile changes in the vitreous which obstruct filtration into the aqueous chamber are perhaps among the predisposing causes, Perhaps also, in minor degree, senile rigidity of the sclera and senile degeneration of the blood vessels.

The chief exciting causes are those conditions which overfill the uveal tract with blood. General disturbances which depress the circulation and overfill the venous system are the usual antecedents. The ciliary processes swell and, by reason of the insufficient circumlental space, push forward the iris-base and compress the filtration angle. Obstructive phlebitis would do this, but there is no evidence that this is a common antecedent of glaucoma.

Atropine, under predisposing conditions, excites glaucoma by thickening the iris-base.

Glaucoma aggravates itself, because increasing pressure on the choroidal veins caused increases congestion of the ciliary processes and increasing compression of the filtration angle.

The anatomical predisposition and the vascular disturbance are complementary to each other in varying proportions. Acute glaucoma presents the maximum, chronic, non-congestive glaucoma the minimum of vascular disturbance.

Each of these points was then taken up separately and carefully elaborated.

Snellen (Utrecht), "On the treatment of glaucoma." Presented his points tersely and so arranged as to permit of but little abbreviation here.

They are therefore given in full.

From a clinical point of view, glaucoma posterius (relative overfulness of vitreous chamber) must be strictly distinguished from glaucoma anterius (relative overfulness of anterior chamber : iritis serosa, keratitis diffusa.)

In glaucoma posterius myotics tend to reopen Fontana's spaces by stretching the iris and contracting the meridional fibres of the ciliary muscle. They excite the circulation.

In glaucoma anterius myotics are prejudicial by extending the surface of the iris and by provoking pupillary adhesions.

Mydriatics act in the opposite way.

Sclerotomy is indicated in all cases of increased tension (hypertonus); it benefits by evacuating serous fluids, loosening peripheral or pupillary iris-adhesions and readmitting the impeded circulation.

The direct thrust of the iridectomy-knife involves less danger of prolapse of the iris than the cut from within outwards of the cataract-knife.

Myotics are a *sine qua non* in performing sclerotomy. The myotic contraction of the iris prevents prolapse ; the contraction of the uveal tract *in toto* promotes the outflow of the fluids, and diminishes the pressure of the choroid against the sclera.

The myotic contraction of the meridional fibres of the ciliary muscle stretches Descemet's membrane, distends the inner mouth of the sclerotomy wound, and promotes the formation of new channelst to Schlemm's canal.

Excision of the iris is a subordinate part of the glaucoma-operation; but it is indicated when the iris tends to prolapse, and when the aqueous humor is retained behind the iris.

The divided sphincter of the iris stretches the iris-periphery less effectually than the undivided sphincter.

Sclerotomy without iridectomy permits repetition of operative treatment.

Impending hypertonus should interdict all straining of the accommodation.

Schoen's theory is a valuable attempt to find the primary cause of hypertonus in a function of the eye.

Although the details of Schoen's explanation seem objectionable, it may prove true, that straining of a diminished accommodation is a cause of glaucoma.

When the elasticity of the lens is lost, contraction of the circular fibres of the ciliary muscle would relax the suspensory ligament, and this relaxation would tend to a forward movement of the lens and ciliary processes.

In glaucoma perfectum exstirpation is indicated by impending pain, and because of its occasional association with intra-ocular tumor.

Extirpation is preferable to exenteration; among other reasons, in the interests of pathological examination.

Schoen (Leipzig), elaborated an extended theory concerning the relation between accommodative excavation and glaucoma simplex, the best part of which he has already published.

Straub (Utrecht), "On the choroid as an elastic organ in the normal and diseased eye." Gave the results of observations made on the eyes of animals showing this elasticity, and its probable relation to the glaucomatous process.

Wahlfors (Helsingfors), "On intra-ocular pressure and its measurement in the human subject." This he had done by means of a manometer, and considered the tension of the normal eye to vary from three to four millimetres.

Discussion.

De Wecker, objected to the point raised by Snellen regarding the advantage of using the triangular knife. He preferred a very thin Graefe's knife instead:

Roeder (Strassburg) made the iridectomy in cataract extractions partly as a protection against the glaucomatous changes which might follow.

Pflueger said that in most of the cases where glaucoma ap-

peared in early life, it was possible to discover a trace of syphilis.

Leber (Goettingen) considered glaucoma due to inflammatory changes at the base of the iris which produced occlusion. Sclerotomy may do well, but iridectomy is a more radical method.

The discussion was also participated in by Samelsohn, Galezowski, Wicherkiewicz, Straub and Schoen.

Afternoon Session.—August 10.

M. C. Hess (Prague), "On the artificial production of cataract without rupture of the capsule." This he accomplished by subjecting rabbits to an electric shock, subsequent examination showed the opacity was due to destruction of the epithelium in the interior of the capsule.

Bernheimer (Heidelberg), "On the human optic chiasma." Described the manner of its embryonic growth, and showed how a few of the fibres do not cross.

Discussion by Schmitt—Rimpler, and Weiss.

Howe (Buffalo, U.S.), "On the influence of flies in the spread of Egyptian ophthalmia." He had found Egyptian ophthalmia to be not a granular conjunctivitis as given in the books, but a conjunctivitis purulenta acuta characterized by periodicity and a remarkable tendency among the natives to corneal complications.

Whatever the starting point of the disease may be (probably gonorrhœal) he ascertained,that its propagation was largely due to the ordinary house-fly. This was shown by

1. The identity of time, the epidemic appearing every year when the flies appear, and disappearing when they grow less.

2. The identity of place. The disease being most common on the Delta and in the cities, very rare on the dessert.

3. The negligence of the natives regarding the flies (illustrated by photographs).

4. The possibility of bacteria being carried from the eye

on the feet of flies proved by plate culture (photographs of these plates shown).

5. The actual occurrence of such infection shown by cases detailed.

Morning Session.—August 11.

Leber (Goettingen), "On bacteriology in ophthalmology."

For most forms of inflammation of the eye we have to accept the theory of a mycotic origin; for some this is proven beyond a doubt. The eye being situated so near the surface of the body is most frequently attacked by microbes from without, seldom from within the body. The same kind of microbes may reach the eye by both these ways.

Certain microbes do not cause inflammation unless they come in contact with a wound, or within the tissues of the body; others excite inflammation of a lighter or severer type on an intact mucous membrane.

The purulent inflammation which follows injuries to or operations on the eyeball is, with but few exceptions, due to microbes, and is very frequently caused by the different kinds of staphylococcus and streptococcus, known to cause purulent inflammations elsewhere.

Experimental researches concerning the mycotic inflammation of the cornea, and more especially the aspergillus-keratitis, give a clear insight into the action of micro-organisms and the origin of reactive inflammation. A focus of microbes which is confined to the center of the cornea exerts a certain action *par distance* upon the nearest vascular tissue, which causes white blood-cells to emigrate into the corneal tissue and into the anterior chamber, and which can only be explained by the theory that the microbes produce certain pathogenic excretions which are diffused in a dissolved state into the surrounding tissues.

This theory receives considerable support from the fact, that a purulent inflammation may be caused by purely chemical substances, as copper or mercury; it is even proven to be cor-

rect since such substances have been extracted and isolated, for instance from pure cultures of staphylococcus.

The reaction of the body is shown first by the emigration of white blood-cells from the blood-vessels, or by their aggregating at the site of the insult. It seems that they are drawn there by the attraction exerted by the pathogenic substance which produces a paralytic condition at the site of the primary insult, by which the pus-cells lose their motility and remain lying at that place.

Further reactions which, as we know, help to remove the microbes and their products, are the phagocytosis and the softening of the invaded tissues, which we may call histiolysis, which latter brings about a demarcation and detachment of necrotic portions, and which seems to be due to a fermentative action of the pus-cells.

The growth of the microbes may, however, overcome the reaction of the body, and its progress be practically without limits.

The intense action of certain microbes growing on the intact conjunctiva (gonococcus and diphtheritic contagion) can also be explained by the assumption that the microbes produce chemical substances which, like the *phlogosine* which has been isolated from the staphylococcus, affect even a healthy conjunctiva.

To determine the manner in which the different microbes act which are found in diseases of the conjunctiva and cornea, much close observation is yet wanting.

I do not doubt that the non-traumatic inflammatory processes of the interior of the eyeball are due to noxious substances brought there by the circulation of the blood, and are in most cases of a microbic origin. We must, however, differentiate between embolisms of septic material or simple adhesion to the wall of the blood-vessel of microbes which circulate in the blood.

The distribution of microbes by the lymph-stream is less frequent. The so-called sympathetic ophthalmia, most probably, is a microbic inflammation traveling to the second

eye by means of the lymphatic spaces of the sheaths of the optic nerve.

The same explanation holds good for the propagation of a microbic infection from the orbit into the sinus cavernosus along the sheath of the abducens nerve after enucleation of the eyeball. Herpes zoster, perhaps, is caused by the migration of a microbic neuritis to the surface of the body.

An injury to the ciliary body in itself does not harbor the danger of sympathetic ophthalmia ; the latter is due solely to the infection of the wound which it may be very difficult to recognize.

Foreign bodies within the eyeball, especially copper, may cause a purulent inflammation without microbes. The diagnosis can easily be verified by culturing the pus. In such cases the extraction of the foreign body may save the eye, and sometimes a portion of its vision, without detriment to the fellow-eye.

Sattler formulated his views on bacteriology in ophthalmology in the following manner:

1. Group.—Mycotic diseases of the eyeball in which the pathogenic germs attack the tissues through an intact surface:

a. Acute blenorrhœa of the conjunctiva. The gonococcus produces an intensely active chemical poison which enables it to enter the tissues and causes the intense symptoms of inflammation.

b. Trachoma. In this disease local and individual conditions are of especial importance. The microbe has not yet been undoubtedly demonstrated.

c. Croup and diphtheria of the conjunctiva. The pathogenic germ is as yet unknown. It seems, however, to produce a very active chemical poison, which is able to kill the epithelium of the mucous membrane, and even its superficial layers.

d. Acute infectious catarrh. Weeks' bacilli, pyogenous staphylococci are almost never wanting in the secretion.

Non-pathogenic microbes in the conjunctival sac. A certain coccus which is similar to the staphylococcus pyogenes albus and the so-called xerosis-bacillus.

2. Group. Bacterial affections, in which a surface-lesion is necessary for the entrance and the development of the pathogenic germs:

a. Primary syphilitic induration of the conjunctiva.

b. Tuberculosis of the conjunctiva.

c. Purulent processes.

But very small quantities of pus-cocci are necessary to cause suppuration of the conjunctiva. When a purulent process is produced by a foreign body, it is less due to the microbes which cling to the foreign body than to those present within the conjunctival sac or on the fingers. Among the microbes found in the earth of the fields no pyogenous microbes were detected.

There are, also, some few kinds of bacteria which produce a progressive purulent inflammation.

There are some kinds of bacteria which can cause suppuration which has, however, no tendency whatever to progress. A typical bacterium of this kind is the so-called micrococcus prodigiosus.

Even some chemical substances may produce a purulent inflammation, but without the faculty to progress. Among these are some nitrogenous organic substances, and especially mercury. Other irritating substances, as oil of turpentine, croton oil, etc., do not produce pus, but a fibrinous exudation.

3. Group. Mycotic diseases in which the pathogenic substance is carried into the eye by the blood or lymph.

Certain purulent processes within the eyeball can be explained by the metastasis. Pus-bacteria which are carried away by the blood-stream from some place of the body may be retained within the eyeball, if there is a local obstacle to the circulation in the eye, as for instance, a thrombosis in a localized area, etc.

Pus-bacteria cannot be the cause of sympathetic ophthalmia. A micrococcus found by the author seems to be the probable ætiological factor.

Chibret (Clermond-Ferrand), bacteriological studies to determine an exact antisepsis in ophthalmology. Found that

the oxycyanide of mercury is better than the bichloride in being more stable, readily soluble, not acid, does not percipitate albuminoids nor corrode instruments so easily. As an antiseptic it is to the bichloride in strength as 14 is to 13.

Discussion.

Knapp considered complete antisepsis of the eye almost impossible, except by means of the heated wire. He referred at length to the readiness with which an eye could be infected with the discission needle, and cautioned against it.

Further discussion by Deutschmann, Schmitt—Rimpler, Samelsohn, Meyer, Leber and Stilling.

Afternoon Session.—August 11.

Dr. Mazza-Andrea (Genoa), attempted to produce sympathetic ophthalmia by causing the staphylococcus pyogenes aureus to pass from one eye to the other, but with only negative results.

Dr. Dor (Lyons), "On coloboma of the upper lid." Had collected 56 cases from the literature and gave an analysis of them.

Discussion by Drs. Nuel (Liège), Weiss and Dor.

Knapp (New York), "On Determination of the meridian of cylindrical glasses." Pointed out the great advantage of a common nomenclature in this respect. Proposed to call the top of the vertical meridian o, and indicating the inclination toward the nasal side by *n*, and toward the temporal side by *t*.

Haab (Zuerich), "On alterations of the macula, with a series of representations of the various changes."

Discussion by Becker, Knapp and Nuel.

Landolt.—A more useful method of numbering prisms. He proposed that this should be not according to the angle at which they are made, but in proportion to the amount of deviation they actually produce—(the angle of miminum deviation). In that way a prism of a certain degree would

correspond to a certain amount of deviation of the eye or the reverse.

The time allotted for papers having expired, discussion began on the next place of meeting, resulting in the choice of Edinburgh in the year 1894.

After a few appropriate words from the President, Donders, the Congress adjourned.

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A CASE OF METASTATIC CARCINOMA OF THE CHOROID.[1]

BY A. SCHAPRINGER, M. D., NEW YORK.

Read before the Ophthalmological Section of the New York Academy of Medicine, May 21, 1888.

Through the kindness of my friend, Dr. August Caillé, of this city, I recently had the rare good fortune of observing a case of one-sided metastatic carcinoma of the choroid occurring in a woman who had had primary carcinoma of the breast. After her death I secured the globe for microscopic examination.

Before describing the details of this case, it will not be superfluous to give a short résumé of all the cases of metastatic neoplasm of the choroid that have hitherto been recorded in literature. They are only five in number.

The first case was described in 1872 by Max Perls, the pathologist, then of Koenigsberg, and later of Giessen.[2] It was

[1] A German translation of this paper will be found in the *New Yorker Medizinische Presse.*

[2] Virchow's Archiv, Bd. LVI, p. 437. ("Beiträge zur Geschwulstlehre.")

that of a laborer, 43 years of age, whose clinical history was that of pleurisy, combined with indefinite lung symptoms. In the clinical notes of the case no mention whatever is made of the condition of the eyes. The autopsy revealed primary carcinoma of the lungs and pleura with metastases in both choroids, as well as in different other organs. On making a microscopical examination of the choroidal tumors, Perls was able in several places to trace a connection between the tubules filled with epithelial cells and the capillary blood vessels, showing that the metastasis was due to capillary embolism.

It was fully ten years later when J. Hirschberg, of Berlin,[1] for the first time had the opportunity of recognizing *intra vitam* a metastatic tumor of the choroid. He gave a description of the ophthalmoscopic appearances, but a post-mortem examination could not be secured in this case. It was that of a woman who had suffered from a tumor of the right breast for nine years, when her eyesight began to fail, first on the right side and later also on the left.

A short time afterwards Schoeler, also of Berlin, published a similar case.[2] It was that of a woman, 33 years of age, who had suffered for six years from cancer of the left breast for which an operation had been performed six months before the intra-ocular metastasis made its appearance. When Schoeler exhibited the patient to the Berlin Medical Society, with the diagnosis of metastatic carcinoma of the choroid, both Hirschberg and Schweigger who were present and examined the woman, hesitated to admit the correctness of the diagnosis, because no differences of level in the fundus could be made out with the ophthalmoscope in the left eye, which was the special subject of examination. (In the other eye the background could not be seen on account of opacities in the vitreous.)

[1]Verhandlungen der Berliner medicinischen Gesellschaft. Sitzung vom 8. Nov. 1883. Berliner klin. Wochenschrift, 1883, p. 75.—Centralbl. f. prakt. Augenheilk., 1882, p. 376.—Von Graefe's Archiv, XXX, 4, p. 114.

[2]Berliner klin. Wochenschr., 1883, p. 105 and 666.—Centralbl. f. prakt. Augenh., 1883, p. 236, 412, 534 and 536.

Schoeler admitted that no *prominence* could be seen, but insisted that there was a *diffuse* thickening of the choroid coat, as the refraction of the background had slowly changed from myopia $^1/_{36}$ or $^1/_{24}$ to hyperopia $^1/_{30}$. The optic disc showed considerable injection, and was surrounded by a greyish-white zone of 1 to 2 PD, gradually fading into the natural color of the background. There were several white patches and a great deal of disseminated pigment. Schoeler's diagnosis was corroborated by the microscopical examination of the eyes made by Uhthoff after the death of the patient. Though the choroid presented a flat surface without any protuberances, sections placed under the microscope revealed the structure of carcinoma. This was the first case in which the results both of clinical observation and of anatomical investigation could be placed on record.

The fourth case was described by Hirschberg and Birnbacher.[1] A woman, 28 years of age, had had her right breast amputated on account of cancer on January 27, 1884, by Von Bergmann, who also removed several small metastatic nodules of the skin at the same time. The wound healed kindly, but nevertheless there was fever and the patient sank rapidly. The left eye had recently become blind; the patient could not tell exactly when. The diagnosis of metastatic carcinoma of the choroid was verified in this case also after death by the microscope.

The fifth and last case which I have been able to find in literature is that of Pflüger, of Bern.[2] Here the new growth was a sarcoma, not a carcinoma. A nævus situated on the side of the neck had undergone sarcomatous degeneration and formed the starting point of numerous metastases, one of which was found in the choroid of the right eye.[3]

[1]Von Graefe's Archiv. f. Ophth., XXX., 4, p. 113.

[2]Arch. f. Augenheilkunde, edited by Knapp and Schweigger, XIV, 1

[3]After preparing this paper for the press, I learned through Vossius' newly published "Grundriss der Augelheilkunde," that Manz, of Freiburg, has also seen a case of metastatic carcinoma of the choroid after primary carcinoma of the breast. The original paper of Manz has not yet come within my reach.

The case observed by Dr. A. Caillé and myself was the following :

Mrs. M. H., æt. 51, a native of Germany, and a resident of New York, had been under the treatment of Dr. Caillé at different periods for the last ten years. Her symptoms were those of hyperæmia of the liver due to chronic constipation. She has had eight children, six of whom died in infancy or early childhood, but not under circumstances which would tend to corroborate a suspicion of syphilis. Between her seventh and eighth childbirth she had a miscarriage in the second month in consequence of an accidental injury. In the year 1880 she had varioloid. On October 6, 1885, Dr. Caillé, assisted by Dr. Ludwig Straus, amputated her right breast for scirrhus, and removed the axillary glands. Dr. Caillé also made a microscopical examination of the tumor, the anatomical structure of which proved it to be carcinoma. The wound healed by first intention. There was no subsequent return of the disease *in loco.*

Early in the month of August, 1887, or nearly two years after the operation, when accidentally covering her right eye with her hand, she discovered that the sight of the left eye was almost entirely gone. She could not see anything at all of objects lying in front of her, but could still notice things situated to the side. There was not the laest change in the external appearance of the eye. Dr. Caillé happened to be in Europe at that time, and the patient consulted another physician who made an ophthalmoscopic examination, prescribed an internal remedy which was probably a solution of iodide of potassium, and atropia locally. About this time her strength began to fail noticeably and she looked cachectic. She became short of breath, especially when mounting stairs. When Dr. Caillé returned in the month of October, he found a considerable amount of fluid in the right pleural cavity. He suspected an intraocular metastatic tumor as the cause of the failure of sight in the left eye, and induced her to come to me for an ophthalmoscopic examination which was accordingly made on October 30, 1887.

The right eye was found to be normal in every respect. The left eye did not show anything abnormal at first sight, except that the pupil was somewhat enlarged and did not respond to light. The central part of the field of vision of this eye was entirely abolished,and so was the upper portion of the periphery. The rest of the periphery of the visual field was preserved so that objects brought into the lower, outer, and inner portion of the periphery of the field could be made out.

On ophthalmoscopic examination of this eye the media were found to be clear. Whilst the refraction of the normal portions of the background was emmetropic, the refraction of the surface of the optic disc was 1.0 D. The outlines of the disc were well defined, and there was a gradual transition from its prominence to the normal level of the neighborhood. The nervous tissue was quite transparent and the vessels were of normal calibre. There was no marked bend in the course of the vessels in the immediate vicinity of the papilla such as is seen in ordinary cases of papillitis. Whilst ordinarily only those portions of the retinal vessels lying within the physiological cup show parallactic displacements, in this case the vessels running through the peripheric parts of the disc also exhibited such displacements. This was evidently due to the fact that a quantity of clear serum permeated the tissues of the optic disc and caused a considerable increase of the otherwise imperceptible difference of level of the blood-vessels.

In the region of the yellow spot, and its temporal vicinity, the color of the reflex of the fundus was much lighter than that of the rest of the background, instead of darker as in the normal. This reddish-white discoloration occupied an area having a diameter about four times the size of that of the optic disc and gradually faded into the normal color of the rest of the fundus except toward the optic disc which was not of normal refraction, as described before, and downward where there was detachment of the retina. The refraction of the discolored area was 3.5 D., which means that this region was elevated to the extent of about one millimeter above its nor-

mal level. A straight line, resembling somewhat in appearance a crack in a broken plate of glass, ran in a horizontal direction, beginning in the immediate vicinity of the outer border of the optic disc and ending in the region of the macula. The length of this line was about twice the diameter of the disc. This line could only be made out in the erect image and with a certain inclination of the ophthalmoscopic mirror. The reddish-white plateau of the region of the macula was permeated by a few thin blood-vessels between which and the regular retinal vessels no connection could be traced. Certain portions of the plateau appeared mottled owing to irregularly scattered pigment.

The lower periphery of the retina presented the usual picture of detachment by serous effusion, but the folding was not very marked, and the red color of the background shone through. The details of the detached portion could be examined with convex lenses of low power, proving that the retina had not yet removed to a great distance from its original position. Corresponding to this detachment of the lower portion of the retina, the upper part of the visual field was wanting as was the central part corresponding to the reddish-white plateau. The lower, outer, and inner parts of the visual field were preserved, as mentioned above.

Guided by the ophthalmoscopic appearances of the case in connection with the clinical history, I unhesitatingly diagnosticated it as one of *secondary carcinoma of the choroid of the left eye*, thereby corroborating Dr. Caillé's surmise.

A small bony tumor about the size of a cherrystone could be felt on the patient's skull at a distant of $1^1/_2$ inch above and behind the right ear. It was not tender, and the scalp covering it was freely movable. She could not say exactly how long this tumor had existed.

On November 17, which was 18 days after my first ophthalmoscopic examination I visited the patient in order to assist Dr. Caillé in aspirating the right pleural cavity, and improved the opportunity by making a second examination with the ophthalmoscope before the operation was begun. The

straight line running from the optic disc towards the macula had disappeared.

The area of the elevated reddish-white field in the region of the posterior pole of the globe had increased in extent, and so had the irregular patches of pigment. The atypical blood vessels of the plateau had become more numerous. The central region of the plateau had a refraction of +4.5 D, or 1.0 D more than at the previous measurement and corresponding to an increase in thickness of about 0.3 mm. of the choroidal tumor supposed to be present. The disc showed some haziness. The detachment of the lower portion of the retina had extended on both sides.

About three pints of greenish-yellow serum were removed from the right pleural cavity by aspiration. No cancerous elements could be made out in this liquid by microscopical examination. On physical examination of the right side of the chest after the aspiration the symptoms of partial atelectasis of the lung were elicited. Besides, both sides presented the symptoms of bronchial catarrh, such as crepitant râles, rhonchi, but no absolute dulness on percussion. The patient complained from time to time of pains in the region of the liver, in the back, the right side of the chest, and in the left side of the forehead, but the pains were never very severe. She was very much annoyed, however, by incessant nausea and vomiting.

Two days after the aspiration of the fluid from the right pleural cavity, so much fluid had formed again that it reached the same height as before the tapping. The operative procedure was not repeated. The patient was sinking rapidly, and after having passed the last two months of her life lying constantly in bed, she died December 27, 1887.

The sight of her right eye was never impaired. The outward aspect, the mobility, and the tension of the left eye remained normal until the end, the only obvious abnormality being the dilatation of the pupil. During the last weeks the margin of the liver, which could be felt plainly on account of the great emaciation of the patient, stood about two inches

below the hypochondriac arch in the mammillary line. It was not nodulated.

The autopsy was not made with such completeness as would seem desirable on account of lack of time and other obstacles such as frequently hamper autopsies in private practice.

For these reasons the small tumor of the calvarium mentioned in the history of the case, the brain, the kidneys and the pelvic organs could not be examined. Dr. Caillé opened the thorax and the abdomen, and I enucleated the left eyeball.

There was a large amount of fluid in the right pleural cavity. The lower lobe of the right lung was adherent to the diaphragm and was permeated by a very large number of round cancer nodules. The other portions of the right lung, as well as the whole left lung, also contained such nodules, but here they were not quite so thick. The free surface of nodules which were situated at the periphery showed a central depression.

The liver was enlarged and hyperæmic. It contained a great number of nodules of the same description as those found in the lungs.

There were no nodules in either the stomach, the heart, or the pericardium.

I am indebted to Dr. J. I. Metzger for taking charge of the enucleated eyeball, and for making sections through it with the microtome.

The appearance of the nests containing epithelial cells in the sections of the choroid is strikingly similar to that observed in microscopical sections of scirrhus of the breast.

It is worthy of special note that the tension of the diseased eyeball had remained normal through the whole course of the disease.

Figure 10 represents a horizontal section of the left eyeball through the optic nerve entrance, seen from above and slightly enlarged. At the time of the last ophthalmoscopic examination the detachment of the retina had not yet involved this latitude. The anatomical examination of the eyeball showed that at the time of death the detachment had progressed to a

small distance above the yellow spot. The detachment involved only the portion of the retina lying to the outer side of

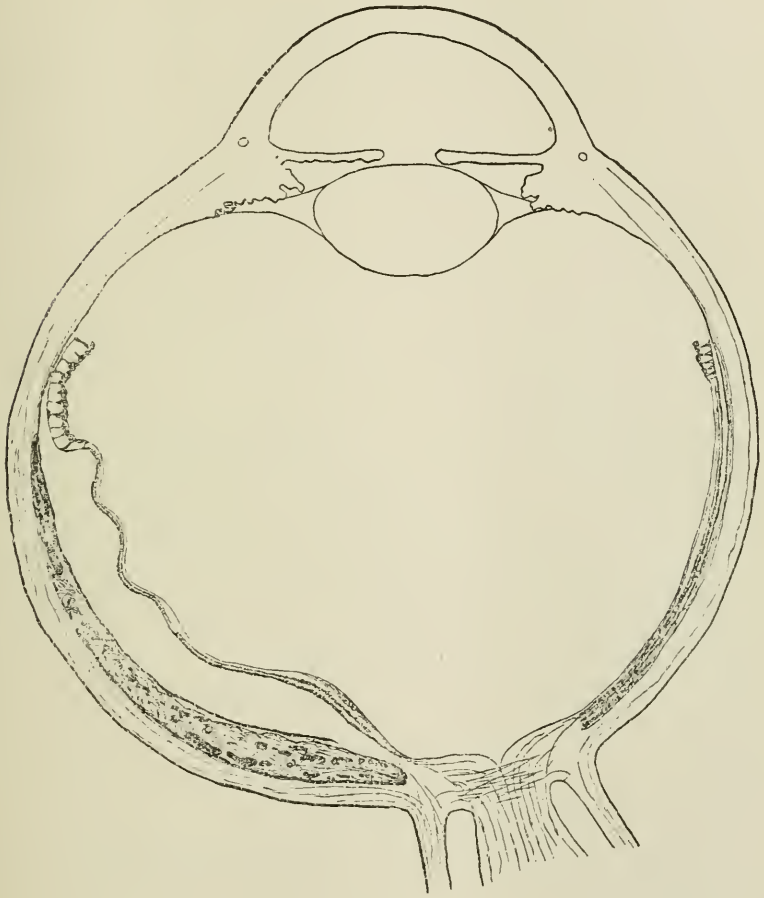


FIG. 10.
Horizontal section through the left eyeball.

the optic nerve entrance. At the *ora serrata* there is well marked cystoid degeneration, especially on the temporal or detached side. Except in the region of the macula lutea the several layers of the retina are well preserved, and can be eas-

ily distinguished everywhere, in the detached region as well as where the membrane is still adherent. The fact that the layer of rods and cones is still present in the temporal or detached portion of the retina proves that the detachment had only quite recently involved the meridian represented by the cut, as it is well known that this layer becomes rapidly disintegrated after detachment.

In the region of the macula lutea the retina is pervaded by small celled infiltration, and hence the differentiation of layers is obscured. A rent involving the whole thickness of the macula and present in the original section has not been reproduced in the cut, since it is evidently due to some accident in the preparation of the specimen. The optic nerve entrance and the small piece of the nerve attached to it show no abnormal tissue elements.

That portion of the section of the choroid which lies to the temporal side of the optic disc is markedly thickened and entirely transformed into carcinomatous tissue. The thickest portion of the new growth is that corresponding to the posterior pole of the eyeball, its diameter at this place amounting to somewhat more than double the thickness of the sclera at the same point. The thickness of the choroidal neoplasm becomes gradually less as we follow it up to the temporal side and at the region of the *ora serrata* it ends with a beveled edge. At the optic nerve entrance the outline of the border of the growth is rounded. The numerous black dots (Fig. 10) represent nests filled with epithelial cells, which can be seen more enlarged at G in Fig. 11.

The portion of the choroid situated on the nasal side of the the optic disc is of normal thickness and structure, except a very small portion in the immediate vicinity of the nerve entrance, which is slightly thickened and shows a few epithelial nests in a row. (Fig. 10.)

The inner surface of the new growth is lined by the pigment layer (E, Fig. 11), which layer is now usually counted as the outermost stratum of the retina. In the region of the posterior pole of the eye, where the neoplasm is thickest, the pig-

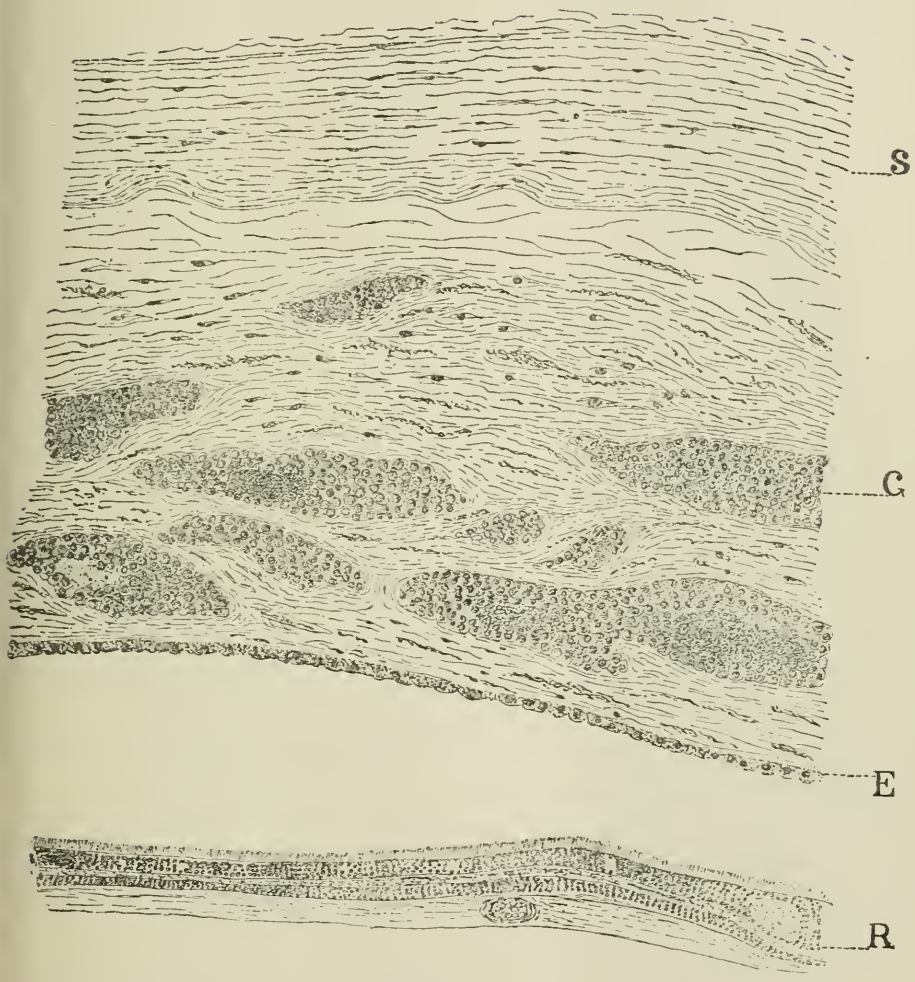


Fig. 11.

S=Sclera.
G=Carcinoma nests in the Chorioid.
E=Pigment-pithelium.
R=Retina.

The drawing was made under a magnifying power of 1 : 100. In the reproduction this was subsequently reduced to one-third

ment epithelium is detached from it to some extent, and being reinforced by some newly-formed connective tissue, forms an independent black membrane which can be easily detached by macroscopic manipulation. (Fig. 10.)

The aspect of the new growth from the surface is just as flat as indicated by the cross section represented in Fig. 10. There is no nodule, prominence or protuberance anywhere. In order not to spoil the specimen I have hitherto omitted to determine the exact extent of the carcinoma above and below.

Fig. 11 represents a portion of the new growth from the region of the equator under a medium magnifying power. With a view of economizing space the distance between the detached retina (R) and the choroidal carcinoma (G) has been made a great deal smaller in the drawing than it actually appeared under the microscope. The sclerotic (S) is entirely normal. The new growth replacing the choroid (G) is composed of a firm groundwork of fibrillar connective tissue, containing numerous nests, replete with large epithelial cells. Besides these cells many nests contain also accumulations of red blood corpuscles. On the whole the area occupied by the connective tissue stroma predominates over that occupied by the cell nests in striking similarity to the microscop cal appearance of scirrhus of the mammary gland, as said before. The stellated pigmentary cells, characteristic of the choroid, are also largely represented, especially in the outer layers of the neoplasm.

On the extreme right of Fig. 11 (at R) a single retinal cyst is seen in the early stage of development.

The great rarity of cases of metastatic neoplasms, compared with the relative frequency of primary malignant tumors of the choroid is in accord with the empirical law thus formulated by Virchow: "Those organs which show a great tendency to form protopathic tumors are rarely invaded by metastases."[1] I think, however, that the extremely small number of cases of metastatic carcinoma of the choroid hitherto observed does probably not represent the actual proportion of

[1]Onkologie, I, p. 65.

their occurrence. If a metastatic tumor of this kind attacks one eye only, and does not cause any change in its external appearance, as in the case just stated, it is apt to remain undetected for a long time. The chances of its detection are also diminished by the fact that patients afflicted with metastatic cancers have only a short time to live.

The subject of this paper, though unquestionably of scientific interest, cannot claim much practical importance, but, I think, is not wholly devoid of the latter. It will be well to keep in mind the flat or diffuse nature of the tumor so nicely exemplified in this case as well as in that of Schoeler. It might cause undue hesitation, or even lead to error in diagnosis. Another point worthy of attention seems to be the following: Patients afflicted with failure of sight due to metastatic neoplasm of the choroid may not themselves be aware that they have cancer of some other organ. Hence, in every case where an intraocular tumor is diagnosticated or suspected, it will be the duty of the oculist to institute a thorough search for a possible primary tumor.

The question whether metastatic carcinoma of one eye is propagated to the other by way of the optic nerve and chiasm is still an open one. Even if further observations should establish this "migratory" tendency of metastatic carcinoma of the eye beyond doubt, prophylactic enucleation will hardly ever be urged in order to save the other eye, since the patients of the class under consideration, being afflicted with metastases in other organs, have only a short lease of life anyhow.

IS ASTIGMATISM A FACTOR IN THE CAUSATION OF GLAUCOMA?

BY SAMUEL THEOBALD, M. D.
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(A paper read before the American Ophthalmological Society, Congress of Physicians and Surgeons, Washington, September 19, '88).

Before entering upon the consideration of the subject proper of this paper, I wish, by way of preface, to state my conviction, based upon somewhat extensive observation, that in astigmatism the direction of the meridians of greatest and least refraction determines, to a very marked degree, the amount of the asthenopia and other ill consequences which usually attend this form of ametropia. That is to say, an astigmatism in which the meridian of least refraction is vertical or nearly so, will, as a rule give rise to very much more trouble—more asthenopia, more headache, and a greater likelihood of pathological changes occurring in the eye—than will one of equal or even greater degree in which the meridian of least refraction is horizontal, or nearly so. What the explanation of this fact is, I am not prepared to say, unless it be, as seems altogether probable, that the former variety of astigmatism is a wider departure from the normal or emmetropic eye than the latter, and for this reason the eye is more intolerant of it, and endeavors more actively and more persistently to overcome it. There can be no question, of course, that the latter variety—in which the meridian of lowest refraction approaches the horizontal—is the more common; and, in my own mind, there is as little question that the non-asthenopic astigmatic eyes, which we all recognize as being by no means rare, belong almost

wholly to this group. On the other hand, experience has convinced me that when the boundary line is over-stepped to even a very small degree, when there is the slightest amount of what has been correctly termed "astigmatism against the rule," —that is astigmatism in which the lowest refraction is vertical or nearly so—asthenopic symptoms are almost sure, sooner or later, to make their appearance.

So fully convinced am I of the correctness of this view, that my practice in dealing with astigmatic cases has been for some time influenced by it. For example, if I find in an asthenopic patient even a quarter-dioptre of astigmatism of this unusual variety, I feel that I have discovered a satisfactory explanation of the symptoms, and I prescribe glasses for the correction of this slight error of refraction, with the utmost confidence that they will give decided relief. If, on the contrary, with so small an amount of astigmatism as this, the meridian of lowest refraction be about horizontal, I hesitate to decide that it is the true cause of the asthenopia, and, if I order correcting glasses, it is not without misgivings as to the result.

Another characteristic of this—as I am sometimes disposed to call it—topsy-turvy astigmatism is that for some reason—perhaps, because the effort to accomplish it is more persistent than in the commoner variety—the eye seems to be capable in an eminent degree of hiding it away, so to speak, of rendering it latent through the action of the ciliary muscle upon the lens, so that its detection and its correction by means of glasses are more than usually difficult; and, when we have prescribed such lenses as seem to be indicated, we can never feel sure that there is not an additional portion which we have been unable, even by liberal use of a mydriatic, to render manifest, and which we shall eventually have to take into account. Still another of its peculiarities is that, even though it be of very low grade, relief from the asthenopic symptoms which it induces is seldom obtained unless the correcting glasses be worn constantly—in distant as well as in near vision; a fact which I invariably take into account in directing how the glasses shall be used.

Lastly, I may add that by far the greater number of pronounced cases of choroido-retinitis from accommodative strain that I have met with, have been associated with this variety of astigmatism: and in view of this experience I need hardly say —and this brings me back to my proper subject—that I have attached more significance to the cases of glaucoma associated with astigmatism which I have met with, and have been less disposed to regard the co-existence of the two as accidental, because, in almost every instance, the astigmatism has proved upon examination to be of this troublesome sort.

I shall not, in this paper, attempt to discuss the almost innumerable theories of the etiology of glaucoma which have been advanced from time to time. It is, perhaps, safe to say that no one of them contains the whole truth, and that most of them are not wholly at fault. When our knowledge of the subject becomes more complete, we shall doubtless be able to draw a much broader distinction than we now do between the very different conditions which, at present, are grouped under the common name of glaucoma, and then we shall probably learn that these different conditions are by no means to be traced to a common cause. Even with our present imperfect knowledge, I think we are justified in believing that in most cases there are two factors which have to do with bringing about the glaucomatous condition: first, a defect or inadequacy in the drainage apparatus of the eye, which it is likely may be either congenital or acquired, and which must be regarded as the predisposing condition, and, second, an excessive formation of fluid in the posterior chamber of the eye, which probably may be brought about in a variety of ways, and which is to be looked upon as the immediate or exciting cause.

Among the conditions which have been suggested as capable of producing such an undue formation of fluid in the vitreous chamber, hyperæmia of the ciliary body and choroidal coat occupies a prominent position. Now, if there be an anomaly of the eye better qualified to produce this condition of hyperæmia, or which, so far as the ophthalmoscope indi-

cates, does more systematically produce it, than astigmatism—and particularly that variety of astigmatism upon which I have laid especial stress—it has not been my fortune to meet with it. It is in this way, then, that I believe astigmatism acts as a factor in the causation of glaucoma. (As bearing upon this view it is well to recal how often attacks of glaucoma are brought on by prolonged accommodation strain, from undue use of the eye in reading, writing, etc.)

The cases which I shall briefly refer to as sustaining this view, I realize, are not numerous enough or of such a character as to afford conclusive evidence; but, they are, at least, suggestive, and deserve, I think, not to be dismissed without consideration. Perhaps the list would have been longer if the subject had not so recently attracted my attention. With but two exceptions they have all been observed with the last twelve months, and all but one have occurred in my private practice. As will appear, they are of two classes, first, cases of pronounced glaucoma in which astigmatism was found to be present, and, second, cases of astigmatism in which there were discovered signs at least suggestive of a threatening of glaucoma. To me, they have seemed of such significance that in future, whenever I encounter a case of glaucoma, not so far advanced as to render such an examination out of the question, I shall feel that I have not done my whole duty until I have carefully tested for the existence of astigmatism and have accurately corrected any appreciable amount of it which the test may have shown to be present.

Case I. Mr. P., age 49. L. eye, chronic glaucoma, with posterior polar lens opacity. When first seen, V. of L. eye was $^{20}/_{\text{LXXX}}$; V. of R. eye, $^{20}/_{\text{XXX}}$ (?). L. eye+T1; R. eye+T1 (?). Has suffered with neuralgic pains in temples, especially on left side. Ah. $^{1}/_{24}$ was found to be present in the L. eye, Ah. $^{1}/_{36}$ in the R. eye, the meridian of lowest refraction being exactly vertical in the former, and at 85° in the latter. Correcting glasses were prescribed (Feb. 16, 1888), which brought the V. of the L. eye up to $^{20}/_{\text{XLV}}$ (?), and that of the R. eye to $^{20}/_{\text{XV}}$ (?). Subsequently an iridectomy was performed upon the L. eye.

Notwithstanding this, however, the glaucoma has progressed in this eye, but the R. eye has done well. When last seen (Sept. 10,) the media of the L. eye were misty, and its T+1. The R. eye, with his astigmatic glass, which he has worn constantly, had, by a very poor light, V=$^{20}/_{XX}$ (?); exhibited no changes in the fundus suggestive of glaucoma; and had Tn.

Case II. Mr. J. P., about 75 years of age. R. eye, absolute glaucoma, with secondary cataract; absence of light perception; intermittent ciliary neuralgia; +T2. L. eye+T1 (?), with slight contraction of nasal half of visual field, and V=$^{20}/_{C}$ (?). Examination revealed compound Ah. in this eye, lowest refraction nearly vertical. Patient declined operation. Prescribed eserine, and for the L. eye ordered+$^{1}/_{72}$ c axis 35, combined with+$^{1}/_{36}$ s for distant, and with+$^{1}/_{}$s for near vision. The former improved V to $^{20}/_{XLV}$.

Case III. G. H., age 74. Chronic, non-inflammatory glaucoma. R. eye+T1 (?); V=light perception. L. eye+T1 (?). Found in the L. eye compound Am. lowest refraction vertical. Prescribed spectacles for constant use, R. eye, plain glass; L. eye—$^{1}/_{72}$ c ax. 90°, which left M=$^{1}/_{15}$ uncorrected; but, this was convenient for his work (varnishing furniture), and was sufficiently satisfactory to him in distant vision. In spite of the glass, however, and the systematic use of eserine, his V. with correcting glass has declined slightly, from $^{20}/_{XL}$ (?), in January last, to $^{20}/_{LX}$ on August 15.[1]

Case IV. Mrs. C., age 61. R. eye, absolute glaucoma; + T2, with intermittent attacks of pain, notwithstanding, she had previously submitted to the performance of an optico-ciliary neurotomy upon this eye. In the L. eye, which exhibited symptoms of incipient glaucoma, compound Am. was found to be present, the meridian of lowest refraction in this instance being horizontal. Correcting glasses were prescribed—for distance, L. eye—$^{1}/_{20}$ s⌒—$^{1}/_{60}$ c axis 180°; for reading+$^{1}/_{72}$ s ⌒+$^{1}/_{60}$ c axis 90°; these gave V=$^{20}/_{XL}$ (?), and J. No. 1 with

[1]At a subsequent visit (Oct. 7) V. was brought up to $^{20}/_{XI}$ (nearly) by increasing the strength of the cylinder to—$^{1}/_{36}$, and combining with it a spherical glass to correct the myopia.

difficulty. The subsequent history of the case is not known.

Three other cases of astigmatism associated with glaucoma have recently come under my observation, but, as two of them were not seen, and the refraction of the other was not tested, until after the eyes had been iridectomized, and it is very possible the astigmatism may have been due to the operation, they do not deserve to be cited in the connection.

The cases which follow are examples of asthenopic astigmatic eyes in which, although glaucoma did not actually exist, there were present symptoms, which, at least, were suggestive of its imminence.

Case V. Mr. B., age 52, merchant. Asthenopia of long standing. Ah. $^1/_{72}$ in L. eye, lowest refraction at 60°; Ah. $^1/_{72}$ in R. eye, lowest refraction at 135°. Anterior chambers very shallow; +TI (?) in each eye; suspicious cupping of both discs. Glasses both for near and distant vision were prescribed, and the asthenopic symptoms were promptly relieved.

Case VI. Mrs. M. B. Compound Ah. $^1/_{60}$ in one eye, lowest refraction at 100°; Ah. $^1/_{72}$ in other eye, lowest refraction at 145°; presbyopia; asthenopia. Each eye had+TI (?), and each disc was hyperæmic and suspiciously cupped. There was also in each eye an easily detected venous pulse.

Case VII. Mrs. F., age 43. Asthenopia and headaches of long standing. Ah. $^1/_{18}$ in L. eye, lowest refraction at 33°; Am. $^1/_{144}$ in R. eye, lowest refraction at 15°; optic discs very hyperæmic. The more astigmatic (L) eye showed a marked pulse in the larger retinal veins; in the other eye the pulse was perceptible, but much less marked.

Case VIII. Mrs. T., age 47. Hypermetropia of high grade in L eye; compound Ah. (H of high grade) in R. eye, meridian of lowest refraction nearly vertical (at 105°); asthenopia and headaches of long standing. The astigmatic eye exhibited a well marked renous pulse, which was not present in the fellow eye. The T of each was above normal.

Case IX. Miss D., age 40. Compound Ah. $^1/_{36}$ in each eye, lowest refraction about horizontal; asthenopia of long

standing, more pronounced in L. eye. In the L. eye there was a very distinct venous pulse, and a suspicious cupping of the optic disc. In the R. eye the disc was hyperæmic, but not cupped, and there was no venous pulse. Tn. in each.

Case X. Mrs. K., age 35. Ah. $^1/_{72}$ in R. eye; compound Ah. $^1/_{144}$ in L. eye, lowest refraction nearly horizontal in each; asthenopia, chiefly in more astigmatic (R) eye, and headaches. The optic disc of the R. eye was extremely hyperæmic, and exhibited a suspicious cupping, which was not present in the other eye. There was also in R. eye a well-marked venous pulse. Patient said she had often seen a halo about candle-flame.

Case XI. Mrs. S., age 33. Marked anisometropia; Am. $^1/_{18}$ in R. eye; M. $^1/_{20}$, with Am. $^1/_{60}$, in L. eye, lowest refraction about horizontal in each; persistent asthenopia, in spite of previously prescribed astigmatic glasses. Each eye showed a suspicious cupping of the disc.

Case XII. Mrs. L., age about 38. Asthenopia of long standing. M. $^1/_{20}$, with Am. $^1/_{16}$ in R. eye, lowest refraction nearly horizontal; Ah. $^1/_{36}$, lowest refraction nearly vertical (at 85°,) in L. eye. Well marked choroido-retinal changes at posterior pole of R. eye, with numerous floating opacities in vitreous. Smaller and less numerous opacities in vitreous of L. eye. Has attacks of pain from time to time in L. eye and left side of face and head, and has observed a halo about candle flame. While under observation the left disc became somewhat cupped, and a venous pulse became established in this eye. The T, however, was never found appreciably above normal in either eye, and the sight of the L. eye remained good. The astigmatism was corrected; small doses of biniodide of mercury, with iodide of potassium, were given, from time to time, for long periods, and pilocarpine (gr.ij to ℥j) was applied to the eye; and gradually the glaucomatous symptoms, including the venous pulse, disappeared, and when the patient was last seen a period of six months had intervened without any signs of a relapse.

EXCESSIVE INTRA-OCULAR HÆMORRHAGE AFTER CATARACT EXTRACTION, FOLLOWED BY ENUCLEATION AND LOCATION OF THE HÆMORRHAGE IN THE RETINA.

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June 5th 1883, I was consulted by G. J., a large full-blooded man of about 50 years of age, for loss of sight in the left eye, which I found to be due to a mature cataract.

The patient being desirous of having it removed, the operation was performed without an anæsthetic.

A small peripheral incision was made with a Graefe's knife and the cataract (which was rather small) removed *without iridectomy*.

The pupil was clear though slightly irregular at its upper margin; but the operation was satisfactory in every respect. The anterior chamber, however, soon filled with blood, and I found it impossible to arrest the hæmorrhage. I therefore applied the bandage pretty tightly in the usual way and put the patient to bed. At 9 P. M., very little pain was complained of; but the compress and bandage covering the eye were saturated with blood. These were removed and a fresh bandage applied.

June 6th. The dressings still saturated with blood, the patient has complained of some pain and is very restless. On examining the eye there is a small clot of blood between the edges of the lids; and the lips of the incision are widely separated by a large piece of vitreous, which projects from between

them. This was removed with curved scissors and the edges of the wound carefully brought together; atropine was dropped into the eye and the dressings again applied.

June 7th. The patient has suffered a good deal of pain during the night, and was forced to sit up several times upon a chair, in which position he seemed to get some relief.

The dressings were again found to be stained by a bloody discharge and the lids and conjunctiva were considerably swollen. The eye was thoroughly bathed with a solution of boracic acid, atropine dropped into the eye and the dressings reapplied. At 9 P. M. renewed the dressing and ordered a pill of $^1/_4$ gr. morphiæ sulph. to be taken every night to relieve pain and secure sleep.

June 11th. Up to this time the inflammation has been very severe, and the patient's suffering have only been relieved by hot fomentations and morphia.

The whole of the vitreous has escaped, and the anterior chamber and edges of the incision are filled with lymph.

June 12th. The inflammation is now rapidly subsiding.

June 16th. At the urgent request of the patient (who was anxious to return to his business) I enucleated the eye, and by the 23d of June he was well enough to attend to his affairs. From this on he made a rapid recovery.

On making a transverse section of the globe immediately after its removal, it was found to be filled by thick discolored lymph; a small clot was discovered near the disc, which upon being removed disclosed a rupture of a small branch of the arteria centralis, which was evidently the seat of the hæmorrhage. When examined with a strong glass, a small dilatation of the vessel was found to exist at the point of rupture.

Dr. B. E. Fryer, of Kansas City, has recently published a case of excessive hæmorrhage after cataract extraction and stated that "in all probability the source of the hæmorrhage was from the stump of the iris."

Dr. F. C. Hotz, of Chicago, Ill., has reported two cases, but considers it likely that the hæmorrhage was from behind the

vitreous in the choroid or retina, and quotes Dr. Albert Mooren in support of his opinion.

My case differs from those reported by the gentlemen whom I have mentioned in the following points, viz.,

1. The operation was performed without an anæsthetic.
2. The cataract was removed without iridectomy.
3. The hæmorrhage was at no time very profuse, though it lasted for three or four days.
4. The eye was removed on the 11th day after the operation and the hæmorrhage definitely located in the retina.

This is the only case of the kind that has fallen under my observation in an experience of nearly twenty years.

The man was very full-blooded and evidently addicted to the excessive use of stimulants. He was the proprietor of a small hotel.

In all such cases the operation should be made so as to allow the aqueous to flow off as slowly as possible, in order that the equilibrium of the circulation within the eye may not be too rapidly disturbed.

AMERICAN OPHTHALMOLOGICAL SOCIETY.

Special Meeting, September 19, 1888.

Morning Session.

Dr. Henry W. Williams, of Boston, President Pro Tem.

Dr. David Webster, of New York, read a paper on

SOME TENOTOMIES FOR THE CORRECTION OF HETEROPHORIA, WITH RESULTS.

He reported forty cases; twenty-five had been operated on but once; in sixteen a second operation was done, and three had previously been operated on by others, making a total of sixty tenotomies. The operations had been done since the beginning of July, 1886. The method was that described by Dr. G. T. Stevens, except that the tendon was always entirely divided. A slight over-correction was usually aimed at and attained. In three cases a slight reduction of the effect was necessary. In a single case he regretted having operated. All operations were done under cocaine, and the eyes tested from time to time, to determine when sufficient effect had been produced.

Among these cases there were four epileptics, none of whom were cured; in one there was a temporary suspension of the fits, and in another they were thought to have been favorably modified. There were two cases of chorea, both of which seemed favorably influenced. In three hysterical males remarkably good results were obtained. Most of the operations were done for headache and asthenopia. The writer had reached five conclusions, viz: That no person should have a tenotomy done for heterophoria, without inconvenience probably due it; very slight degrees may cause trouble, and should be attended to. All other methods should be tried before

tenotomy. The operation should be performed under cocaine, and the eyes from time to time tested to guard against over-correction ,and that in properly selected cases, the results are quite as good as are obtained by most other surgical procedures.

Dr. Samuel Theobald, of Baltimore, read a paper (see p. 298, this issue) entitled

IS ASTIGMATISM A FACTOR IN THE CAUSATION OF GLAUCOMA ?

He was convinced that the direction of the meridians of greatest and least refraction determines to a marked degree the amount of asthenopia, etc., attending this form of ametropia. When the meridian of lowest refraction is vertical or nearly so, the asthenopia, headache, and likelihood of pathological changes in the eye are greater than when it is horizontal or nearly so. The slighest degree of astigmatism of this character almost always gives rise to trouble, and if it amounts to not more than 0.25 D., requires to be corrected. The non-asthenopic astigmatic eyes are rarely of this sort, but cases in which the meridian of least refraction approaches the horizontal. Astigmatism in which the meridian of least refraction approaches the vertical are less common, and must be regarded as the wider departure from emmetropia. Because of a more persistent effort of the ciliary muscle to correct it, this form is more difficult to detect ; and it will not all be revealed at a first examination, even by the aid of a mydriatic. The writer found this variety of astigmatism in almost every instance associated with glaucoma, so that he was disposed to regard the association as not accidental. Hyperæmia of the ciliary muscle is a common result of astigmatism, especially of this form. This would induce an undue flow of fluid into the vitreous, and if the anterior drainage apparatus happened to be inadequate, a glaucomatous condition would result. Cases of glaucoma with astigmatism of this form, and of astigmatism mostly of this form with threatened glaucoma were related.

Dr. Peter A. Callan, of New York, read a paper on the

TREATMENT OF ULCERS OF THE CORNEA.

The ulcers occurring in young persons and children are really phlyctenulæ of the cornea, or neglect of lid friction causing absorption gives rise to an ulcer. The treatment is yellow oxide of mercury salve (two to ten per cent.) placed between the lids once daily; atropia and cocaine if necessary; tonics; open-air exercise; regulation of diet; airy sleeping quarters; smoke-glasses; avoidance of dark room or bandages. The ulcers due to conjunctivitis need no special treatment other than that for the disease causing them. In gonorrhœal ophthalmia, ophthalmia neonatorum, or granular lids, we always redouble our efforts when the cornea is likely to become involved; cutting the canthus, applying leeches or ice, etc. He referred especially to ulcers occurring without apparent cause due to some constitutional trouble, malaria, syphilis, etc. For these give the remedy for the constitutional ailment, and locally cocainize the eye thoroughly, and clean the ulcer with a piece of absorbent cotton wrapped on a holder, and with the same as an applicator swab the ulcer, leaving no part of it untouched, with a two per cent. solution of silver nitrate. This may have to be repeated two or three times in the course of as many days. Bathe the eye with hot water, (120° to 130° F.) three times daily for a half-hour. If much corneal irritation exists, bathe with boric-acid solution, and use atropine and cocaine after each bathing. The point is to get a clean wound; and silver nitrate, besides stimulating repair, is a safer, better means of doing this than any other known to the writer.

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Afternoon Session.

Dr. Edward Jackson read a paper entitled

MERIDIONAL ASTIGMATISM.

By this name was designated the defect of the eye which caused a difference between the refraction of the eye at the

centre of the pupil, and the refraction at the pupillary margin. It is to be detected and studied by the shadow-test, with which it causes an erect image and an inverted image of the light area to be seen in the pupil at the same time; one at the centre of the pupil, the other at its margin. His deductions of practical interest were that it was the lower degrees of the defect that were most likely to interfere with vision; that it was a cause of different refraction in the eye with a contracted pupil from that of the same eye under a mydriatic; and that it was especially apt to cause symptoms of asthenopia in those whose complaints were chiefly connected with near work or exposure to bright light.

The committee, composed of Drs. Edward Jackson, Henry D. Noyes, and Swan M. Burnett, appointed to consider the

PROPOSITION TO DESIGNATE PRISMS ACCORDING TO THEIR REFRACTFIE POWERS,

recommended the indorsement of the following propositions:

1. Prisms ought to be designated by the number of degrees of "minimum deviation" they produce.

2. Where intervals of less than one degree are desired, half-degrees and quarter-degrees should be used.

3. To indicate that degrees of deviation are meant, the letter "d."shall be added. Thus, "prism 2°d." will indicate a prism that produces a minimum deviation of two degrees.

Dr. J. Oscroft Tansley, of New York, exhibited and explained.

A NEW INSTRUMENT FOR DEMONSTRATING REFRACTION,

consistment of a box with glass sides, with a magic-lantern attachment, and arranged for the adjustment of various lenses. The box was to be filled with smoke, in which the courses of the rays from the lantern would be quite plainly visible.

Dr. W. F. Mittendorf, of New York, reported three cases of

ACUTE COCAINE CONJUNCTIVITIS.

It was to be expected that idiosyncrasy, such as constitutes a bar to the use in certain cases of other drugs, would be found to exist with reference to cocaine. These cases occurred after the use of a four per cent. solution of the drug, and were characterized by swollen, shiny lids, and a profuse acrid discharge. Two of the cases occurred in elderly women and the third in a man. In one of the women, after relief had been obtained by cessation of the use of the drug, a renewal of its use was promptly followed by a renewal of the trouble. In the man three separate attacks were caused at different times by different applications of the drug. It is likely that the condition is due to a paralyzing effect of the drug on the terminal sympathetic nerve filaments.

Dr. S. M. Burnett, of Washington, exhibited some.

APPARATUS FOR DIAGNOSIS OF REFRACTION.

This consisted of a disk of lenses to be used in applying the shadow-test, arranged to be fixed to the wall and adjustable to any height, and readily used for either eye, or swung out of the way when not in use.

Dr. Carl Koller, of New York, read by invitation a paper on

BLEPHAROSPASM.

Although this is only a symptom, it is an important one. Cases might be divided under three heads; viz., the neurotic, the hysterical, and those in which it was a reflex of irritation of the nerve-endings of the cornea and conjunctiva. The latter included the cases of phlyctenular disease. Cocaine, from which he had at first hoped much, had proved useless, exerting but a slight influence when very freely applied. An essential factor in the continuance of the spasm is a fissure that forms at one canthus, usually the outer, making a condition resembling fissure of the anus. The cure here may be effected by division of the muscle, but this is not usually neces-

sary. Treatment of the conjunctival condition, cauterization of the fissure with copper sulphate, and the application of the of the ointment of yellow oxide of mercury are commonly sufficient.

Dr. H. Derby, of New York, reported a case of

MONOCULAR OPTIC NEURITIS,

in which the swelling of the papilla at one time reached seven dioptrics, and light—perception was last. Under large doses of potassium iodide, and mercurial inunctions, the swelling had been greatly reduced and vision had returned and improved to seven-tenths.

Dr. O. D. Pomeroy, of New York, reported five cases of

REMOVAL OF THE DISLOCATED CRYSTALLINE LENS WITH THE BIDENT.

This instrument, proposed by the late C. R. Agnew, had proved a very satisfactory aid in the hands of the few who had tried it. In all these cases good vision was obtained. Care must be taken not to press the lens too far forward with the bident, and it must be extracted with a scoop or sharp hook. —*The Med. Rec.*

CORRESPONDENCE.

A SPELL OF PTERYGIUM.

Having had occasion to look over a great many medical certificates of confreres, I was struck by the bold privateering spirit prevailing to a large extent, in the method of spelling many quite ordinary and simple words. From among them I selected the word pterygium, which may be classified as an ordinary word in medical literature, and have carefully trans cribed and preserved every deviation for the commonly accepted method of constructing this word.

Pterygium is not a hard word to spell correctly and the struggle for originality in many of these efforts is worthy of a better cause. Each one of the vagaries which I present below is the product of a "Board" of three regular practitioners of medicine, is duly signed and sent to one of the Government Departments in Washington.

It will, doubtless, be questioned whether all of these coruscations are designed to be synonyms for pterygium. I confess that, at first glance, I failed in many instances to recognize this word, so ingeniously was it concealed in reduplica tions and unusual initial letters. In all doubtful cases, however, I verified my suspicions by a careful study of the context.

I hope this communication will prove of interest to the advocates of higher preliminary education for physicians. I make no attempt to classify my list, but put the words down in the order in which I captured them :

Ptyterigium,	Terigium,	
Ptyrigion,	Terygerum,	
Phrygium,	Ptyrrigim,	
Pteerygiam,	Pterregium,	
Ptyrigium,	Teryguim,	
Turgeum,	Pterygum,	
Tergeum,	Pterygrum,	
Purygium,	Sterygium,	
Pteregium,	Pteryrigium,	
Ptyregium,	Ptrygium,	
Terrigeum,	Pterygima,	
Peterygium,	Ptegruggie,	Plural forms.
Ptererygium,	Ptrygii,	
Pterigium,	Pterygion,	
Pteygium,	Ptergium,	
Styrrigium,	Ptreygium,	
Pterrigum,	Ptregyium.	

THOS. FEATHERSTONHAUGH, WASHINGTON, D. C.

EDITORIAL NOTICE.

We have received the second annual announcement of systematic courses in ophthalmology and otology by the attending surgeons of the Illinois Charitable Eye and Ear Infirmary, corner West Adams and Peoria Streets, Chicago, Illinois.

Faculty.

Professor Emeritus, Edward L. Holmes, M. D.

Professor Ferd. C. Hotz, M. D., President, Operative Surgery of the Eye.

Professor Lyman Ware, M. D., External Diseases of the Eye.

Professor Wm. T. Montgomery, M. D., Treasurer, Internal Diseases of the Eye and the Ophthalmoscope.

Professor Edwin J. Gardiner, M. D., Refraction, Accommodation and Mobility.

Professor Ira E. Marshall, M. D., Aural Anatomy, Physiology and Operations.

Professor Seth S. Bishop, M. D., Secretary, Clinical Pathology, Therapeutics and Operative Surgery.

Announcement.

The Attending Surgeons of the Illinois Charitable Eye and Ear Infirmary will conduct consecutive monthly sessions of clinical and didactic lectures during the years of 1888-89.

The sessions will begin on September 1, 1888, and close on July 1, 1889. The schedule is so arranged that students and practitioners may enter the sessions at any time and complete the course in four weeks.

These courses are given at the Eye and Ear Infirmary, the clinical facilities of which are unequalled in the Northwest. During the year 1886 there were 4,451 patients treated in this institution, with an average of 215 treatments per diem, making a total of 67,000 treatments given during the year, with

656 surgical operations. Hence it is evident that those who are desirous of perfecting themselves in theoretical and practical ophthalmology and otology may enjoy as abundant advantages at home as it would be possible for them to utilize abroad.

In these courses the student has opportunities not only to witness the various operations on living subjects, but also to perform them on cadaverous parts.

Practical demonstrations are given in the use of all the important eye and ear instruments, including ophthalmoscopic and otoscopic examinations, enabling the student to become thoroughly practiced in the skilful manipulation of these instruments.

Numerous pathological and osteological specimens, dissectible models of the eye and ear in plaster, wax and paper; the microscope and laboratory liberally illustrate and simplify the subjects of anatomy, physiology, histology, pathology and bacteriology as relating to the eye and ear.

Refraction and accommodation are thoroughly taught, and students acquire practical experience in the art of fitting glasses.

The lectures are given daily from 3 to 4 P. M.; allowing students to witness treatments and operations during the regular clinic hour, from 2 to 3 o'clock, and to return to their respective colleges in time to attend their afternoon lectures.

Certificates are awarded after attendance upon one session.

The fee for one course is $25.

Further information may be obtained by addressing the secretary,

SETH S. BISHOP, M. D.,

The vacancy in the chair of ophthalmology at the College of Physicians and Surgeons, caused by Dr. Agnew's death, has been filled by Dr. Hermann Knapp.

Dr. Chas. S. Bull has been appointed to the chair of ophthalmology at the University Medical College, New York.

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AN ALLEGED DEFECT OF THE PRISOPTOMETER.

BY H. CULBERTSON, M.D., ZANESVILLE, O.

It has been stated to me, that, in correcting ametropia with the prisoptometer, the correcting glass should be placed *next to the eye*

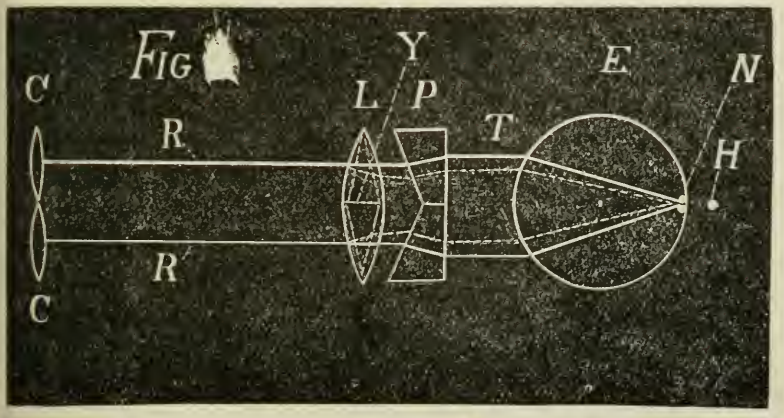


FIG. 12.

of the observer, and not upon the *distal* side of the prisms and

eye-plate, as now arranged in this instrument. This subject may be illustrated by the following figure, in which T is assumed to be the proper point to apply the correcting lens by the objector, instead of L, the location of the correcting glass as now arranged in said instrument. At C C′ is represented, the circle C and its false image C′, which are placed and seen at a fixed distance given with each instrument, from four to six metres, from P, the double-prisms, the apices of which latter are placed in contact. The heavy rays of light RR′ from CC′ are parallel, and supposing the + lens L removed, then these rays reaching the prisms at P, will be refracted outward, toward the base of the prisms, and after leaving the prisms P, will again become parallel and thus, incident upon the cornea will be brought to a focus upon the retina in the emmetropic eye E as seen at N. When this occurs the inner margins of CC′ and the little circles as shown at N will be tangent. The distance from P′ to CC′ is so arranged or adjusted that this contact shall result in the normal eye at CC′ and N. It is evident that to obtain this contact the rays of light must be parallel and reach the cornea of the eye E parallel, else tangency will not obtain. It is maintained that the eye, in relation to this instrument should be so placed, that the distance, from L to the cornea E, should be thirteen millimétres, or about half an inch. When the eye is closely applied to the prisms, its cornea is about that distance, (that of L to E) in the instrument as now manufactured: But still it is held by one party that L, the correcting glass, should be placed at T. To do this the proximity of the patient's face would be so close to the prisms as to inconvenience the oculist and patient by the frequent removal of the face of the latter, and as the breath of the latter would cloud the trial lenses by breath-moisture, and hence the object-circles would be obscured.

The problem then is, does the position of L, when the correcting *glass is close to the prisms*, as shown in Fig. 12, impair the obtaining of the true correcting glass sought. It must be restated, that when the correcting glass L is *not in situ*, in the instrument, the prisms P cause rays of light incident upon the cornea to be parallel.

The practical test of our subject is as follows, and can be demonstrated by all who have the prisoptometer, that it is immaterial how close or far from E, the eye is from the prisms P to the right of the prisms, and that it is immaterial whether the correcting glass be placed at T or L.

For example let an ametrope with =D 1.5 of hyperopia be the subject. The object-circles, CC′ are seen apart, and on placing +D.1.5 sph. at L, they become taugent, the eye E being close to P. the prisms. If now this+lens be transposed to T the object-circles will still be tangent. In the position of L or T, the images of the object-circles still touch in the now corrected eye, and in either location of the correcting glass at L or T, if the eye be withdrawn to the right from the prisms, the circles will still be seen in contact. Even if we remove the eye to the right six inches the images are still seen to touch. And again if we place the eye at six inches to the right of the prisms and apply the +D 1.5 spheric at thirteen millimétres from the cornea, the object-circles will still touch.

These practical experiments denote that the correcting glass has, so far, been obtained, but mainly, illustrating our views, that it is immaterial whether the correcting glass be placed at L or T, or if the eye be close or more removed to the right from the prisms.

It is however important that the eye be close to the prisms as a clearer view will be obtained of the object-circles, through the aperture of the instrument on the T side of the prisms, and the head will be more immovable placed against the instrument.

Why is the position of the correcting glass in the sense we are now considering, immaterial, whether it is placed at L or T? In a word the answer is that the rays of light reach the cornea parallel even when the correcting glass has been applied, and the rays so approximated to the axial line of the eye; that whereas they were apart and not in focus at N, but tending to a focus at H, Fig. 12, now when the correcting glass is applied, these rays are caused by this glass to approximate so much nearer to the axial line of the eye as to enable *this hyper-*

opic eye by its refractive power, defective as this is, to bring to a focus such induced parallel rays. This is illustrated by the dotted lines in Fig. 12, in which it will be seen that these punctated lines reach the cornea parallel, and that these lines are so much nearer and are parallel to the axial line of the eye, that even *its* defective refraction is now sufficient to enable the eye to induce a focus upon the retina, because said lines are less distance apart from each other.

It will be seen at a glance, that it is immaterial whether this correcting glass be placed at L or T, for if at T the prisms will first cause divergence, and then subsequently the + glass will induce approximation of the rays. If the + glass is placed at L the order of refraction will be reversed, but the result will be the same, *i. e.*, parallel lines incident upon the cornea.

So far as the refraction of the prisms is concerned, the rays are always parallel when the correcting glass is *not* in position, and by the correcting glass, the normal parallel rays of the instrument are brought nearer to the axis of the eye, the dark lines becoming the dotted lines, (as see Fig. 11,) and enabling the power of this hyperopic eye, to focus the rays of light upon the retina at N. It is immaterial what the power of the correcting glass may be, this parallelism of the rays of light will be induced when the inner edges of the object-circles CC′ shall have become tangent.

It is also probable that this correcting lens, L, acts as a double-prism, with base to base, as see Y, Fig. 12, and denoted by the dotted lens within the area of L.

The fact would seem to be, that with the prisoptometer, we are by the application of correcting glasses, simply acting upon the prisms P, and causing a variation in the position of the normally parallel lines of the instrument. As the degree of hyperopia increases, so more and more will the parallel (dotted) rays be brought closer to the axis of the eye by the proper correcting glass, acting, probably, as prisms, with their bases applied as seen in Fig 12. If these views are correct it is immaterial where the correcting glass is applied, at L or T.

But it should be stated that it is of *great* importance that the correcting glass be placed *close* to the prisms at L, for if removed beyond 13 millimétres to the left of the prisms P there will be error induced both in + and — from glasses, their separation to the left from the prisms. In fact these prisms, as arranged in the prisoptometer seem to act as does the eye, when correcting glasses are applied to it, increasing the power of convex glasses and diminishing the size of the image by concave glasses by the removal to the left of the lenses from the eye or prisms.

If the defect is myopia, see Fig. 13, concave glasses acting

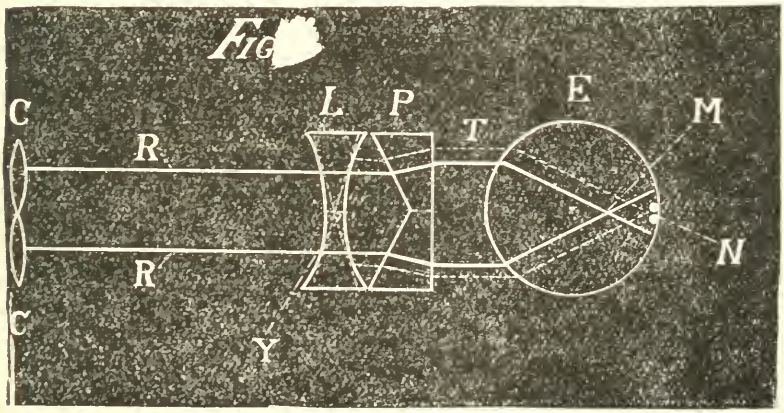


FIG. 13.

as prisms, their apices applied to each other as seen at Y, Fig. 13, will cause the dark parallel lines RR′ to be removed further from the axial line of the eye, and to take the direction of the dotted parallel lines incident upon the cornea, and hence the focus, M, of the ametropic eye E, will be cast posteriorly upon the retina as represented at N, Fig. 13.

As the principle is the same as expressed above as to hyperopia, only the negative trial glass acts the reverse of the positive lens, spreading in lieu of approximating the rays, the same conclusion may be drawn as to the position of the glass at L or T as has already been explained above in

hyperopia, and hence it is not necessary to restate what has already been written above. A reference to Fig. 13 will explain all that need be said as to the location of the correcting glasses in myopia with the prisoptometer.

If our theory is a fact, then it may properly be concluded from the foregoing considerations that, the trial glasses should be placed at L, (and not at T,) close to the prisms, P, as now placed in the prisopmeter, in correcting all forms of ametropia with this instrument.

A CASE OF PULSATING EXOPHTHALMOS PROBABLY DUE TO RUPTURE OF THE CAROTID ARTERY IN THE CAVERNOUS SINUS.

BY F. BULLER, M. D.,

Professor of Ophthalmology, McGill University. Ophthalmic Surgeon to the Montreal General Hospital.

Pulsating exophthalmos occurring spontaneously or as a result of traumatism is met with so seldom that every new case of this kind may still claim a place in the records of Ophthalmic Surgery; at the same time the pathology of this affection is now so well understood, in the light of cases already recorded that little or nothing new in this direction remains for present or future observation. In the matter of treatment, however, there is no rule so firmly established but that much must be left to the judgment and discretion of the surgeon. Injury to the carotid artery in the cavernous sinus is no doubt much more common than the records of surgery seem to show. The case I am about to describe is the fourth I have myself seen, two of which have certainly not found their way into ophthalmic literature. The first occurred in a man 45 years of age who was thrown from his horse, striking his head violently on the frozen ground; a few weeks later pulsating exophthalmos gradually made its appearance and steadily augmenied for several months. At this time there was enormous proptosis and a large soft pulsating swelling over the inner end of the right eyebrow. Here too a harsh bruit could be heard with the stethoscope and the patient was much troubled with a pulsating noise in the head. Ligature of the carotid was finally performed, but I believe the patient died a few weeks

later from repeated and severe attacks of epistaxis. The second case has been placed on record by Walter Rivington. [*Med. Chirurg. Transact.*, Vol. LVIII, p. 183.]

The third case was in a young man who in a boiler explosion was struck over the left brow by a large fragment of iron, receiving a depressed fracture of the frontal bone. About four weeks later he came to me on account of defective vision of the left eye. I found the vision of this eye very much impaired and a pronounced atrophy of the optic nerve. He was under observation about ten days during which time he had two slight attacks of epistaxis. A day or two later just as he was leaving home to visit the hospital he was suddenly seized with a violent epistaxis and bled to death in a few minutes. The post mortem showed a depressed fracture of the frontal bone, a fissure extending from this across the orbital roof, the optic foramen, and the body of the sphenoid directly beneath the cavernous sinus. Here an ulceration of the bone had taken place and a direct communication was established between the vault of the left nostril and the left internal carotid, which had either been perforated by a spicule of bone at the time of the injury or had subsequently become involved in the ulcerative process affecting the bone beneath it.

In this case the aperture in the artery did not communicate with the cavernous sinus, hence there was no arterio-venous aneurism.

The fourth case being the subject proper of this communication came under my observation on the 24th of last May.

About the middle of last February, W. G., aged 28, a robust and perfectly healthy young man fell from a railway bridge a distance of twenty feet striking the right side of head and face on a piece of square timber. Was said to have been unconscious for about twenty-four hours. Both upper and lower jaw on the right side were supposed to have been fractured, but there are no signs of this lesion now discoverable.

The right side of the head and face were greatly swollen for several days, the right eye being closed for five days after the injury.

During this time he suffered a good deal of pain in the injured parts. When the swelling subsided so that he could see again with both eyes, there was diplopia, one object appearing higher than the other, and less distinct. As soon as he recovered consciousness, he also became aware of a loud beating sound in the right ear which has continued unabated ever since.

After a few days there was no more pain, but the eye remained moderately swollen, and the diplopia was constantly present, the higher, false image, moving perceptibly up and down with each heart-beat.

During the succeeding eight or ten weeks there was no perceptible change in his condition, and he was able to follow his employment. About two weeks ago he again became troubled with pain, which was chiefly referred to the orbit and brow. With this there was a marked increase in the prominence of the eye and the swelling of the eyelids. Four days ago the pain became intense, so that he was unable to sleep at night. It was indeed the pain that finally induced him to give up his work and seek relief.

When I first saw him the appearance of the eye was strongly suggestive of orbital cellulitis. The lids had a tense dusky and swollen aspect, the eyeball was strongly protruded and stationary, whilst the swollen and œdematous ocular conjunctiva extending far in advance of the palpebral fissure was covered with a watery and mucous secretion. The conjunctiva generally was in a state of well marked venous hyperæmia. The refractive media were unimpaired, and, when the upper lid was slightly raised, there was no difficulty in making a satisfactory ophthalmoscopic examination; this showed a somewhat œdematous condition of the retina, this structure being somewhat cloudy, with enlargement and tortuosity of its venous system. The optic nerve was not swollen, though its margins were slightly indistinct. In other respects the fundus oculi was perfectly normal. Vision was reduced to $^{20}/_{C}$, the pupil, slightly dilated and fairly active, the visual field unim-

paired. Displacement of the eye amounted to about $^{5}/_{10}$ inches in an outward, and $^{6}/_{10}$ inches in a forward direction.

At the inner extremity of the eyebrow there was an ill-defined swelling, soft and elastic to the touch, and imparting a distinct thrill to the examining finger; just at this point, too, the stethoscope disclosed a harsh, rasping bruit, synchronous with the action of the heart. This sound was distinctly audible for a considerable distance upwards, and also outwards as far as the zygoma. Pressure over the common carotid greatly diminished its intensity.

The eyeball could be pressed nearly into its proper place, but when this was done, it communicated to the fingers a strong pulsation. A pulsating movement of the eye was also readily seen in profile view.

Pressure over the carotid artery caused almost complete cessation of the pulsation, with softening and reduction of the swelling in the orbit.

Under these circumstances there could be no reasonable doubt we had to do with an arterio-venous aneurism.

Dr. Shepherd and several other members of the hospital staff kindly examined the case with me and it was decided to ligate the common carotid artery without unnecessary delay, the reasons for this decision being as follows:

Pressure over the artery caused reduction of the protrusion of the eye, softening of the orbital swelling and almost complete abolition of the pulsation without distress or inconvenience to the patient, who was moreover a healthy, vigorous man, and likely to bear the operation well. The recent increase in the swelling attended as it was with severe pain and rapid deterioration of vision threatened irreparable damage to the sight unless some speedy means of relief could be obtained. The man himself was exceedingly averse to any form of treatment that did not promise an immediate cure.

On the following day, May 25th, Dr. Shepherd ligated the common carotid in the upper part of its course with the usual antiseptic precautions. Two ligatures were placed around the artery and the vessel severed between them. The edges of

the wound were brought together over a decalcified bone drainage-tube and an antiseptic dressing applied. The immediate effect of the operation on the orbital tumor was the same as had been temporarily obtained by digital compression, softening of the swelling, partial reposition of the eye, great diminution in the pulsation and total cessation of the bruit.

Recovery from the anæsthetic was perfectly normal, without the slightest sign of impairment in the cerebral or nervous functions.

May 26th. Proptosis greatly diminished, the conjunctival œdema has nearly disappeared. Vision greatly improved, and the voluntary movements of the eyeball are tolerably free. There is no diplopia. Patient feels perfectly comfortable.

May 27th. Uninterrupted improvement.

May 28th. Feels quite well and "can see nicely" with the affected eye $V=^{20}/_{XL}$. States that since the operation there has been no noise in the ear. Proptosis now only slight in degree.

June 4th. Dressings removed from the neck to-day, the wound found to be completely healed and the bone drainage tube entirely absorbed. Can see as well as ever. $V=^{20}/_{XX}$. Movements of the eye appear to be entirely normal, the globe however, is still somewhat displaced forwards.

June 12th. Patient thinks himself cured and declines to remain longer in hospital. Beyond a slight fulness of the orbit there is no indication of the recent orbital affection.

A CASE OF DOUBLE VASCULAR EXOPHTHALMOS.—RECOVERY UNDER INTERMITTENT COMPRESSION OF THE RIGHT CAROTID ARTERY AND THE INTERNAL USE OF THE IODIDE OF POTASSIUM. COCAINE CONJUNCTIVITIS[1].

BY CHARLES J. KIPP, M.D., NEWARK, N. J.

Mrs. M., a stout but feeble lady 76 years of age, consulted me for the first time on August 4, 1886, for protrusion of the eyeball, impairment of sight, and a very loud noise in her right ear and the right half of the head. I learned from her that she had always been in good health, and that her sight, up to a year ago was good. About three months before her visit to me she fell down several steps and struck her head against the ground. She was stunned by the fall, but did not become unconscious. No hæmorrhage from nose, mouth, or ear, followed the fall. As to the exact date of the beginning of the noise she is in doubt, but thinks that it was present some days before the fall, since then it has, however, been much louder. The members of her household attribute it to her fall. Up to two weeks ago she heard the noise in both ears, now she hears it only in the right half of the head. The noise prevents her from sleeping, and has made her very nervous. The protrusion of this eye was first noticed after this fall.

On examination I found both eyes much protruded forward and slightly downward; the right, perhaps a little more than the left. I estimated the protrusion of the right eye at 5 mm., that of

[1]Read before the American Ophthalmological Society at New London, Conn., July 18, 1888.

the left at 4 mm. The upper lids were enlarged but not red. The mobility of both eyeballs were considerably impaired in all directions. The impairment was greatest in the right eye, and most marked outward. The external rectus muscle of this eye was paralyzed. At the upper and inner angle of the orbit there was a marked fulness, but no tumor could be felt. There was no visible pulsation of the eyeballs, and none was felt on pressing the eyeballs back into the sockets with the hand. On placing my ear against her right temple I heard a loud blowing noise with every pulsation of the carotid, and a fainter continuous sound could also be heard at times. Farther examination revealed that the bruit could be heard all over the anterior half of the head. I could also hear it below the right ear. On compressing the right carotid artery the bruit ceased entirely at once, but the protrusion of the eyes re-remained unchanged. Compression of the left carotid artery considerably lessened the bruit, but did not stop it. There was a very marked pulsation over the junction of the sternum with the right clavicle, no tumor could be felt, however. The heart seemed healthy.

The condition of the eyes was as follows: The ocular conjunctiva was quite œdematous, and its veins very broad and tortuous. The cornea was clear. The anterior chamber of normal dimensions. Iris normal; pupil active. Lens contains numerous opaque stripes in both anterior and posterior cortical layers. The vitreous body contained many large floating opacities. The optic disk was of a greyish color and flat. It was surrounded by a very broad white ring (atrophy of choroid). Retinal vessels of about normal size. Retina transparent everywhere. No other choroidal changes. Both eyes were in about the same condition. Right eye: Hm. 1.5 D. S= $^{5}/_{XVIII}$. Left eye: Hm. 1 D. S= $^{5}/_{XXIV}$.

As digital compression of the carotid artery produced no unpleasant head symptoms, I taught the patient and a member of her family how to control the right carotid, and directed pressure to be made at short intervals for as long a period as she could bear it. At the same time I prescribed iodide of

potassium in five grain doses three times daily. For the hyperæmia of the conjunctiva I gave her a collyrium composed of boric acid and cocaine.

For a few weeks the compression of the right carotid was kept up by the patient for several hours daily, but after that time she applied it only when the noise in her head was unusually annoying, as the pressure gave her considerable pain. The iodide of potassium was increased to 30 grains daily.

Nine weeks after her first visit to me the exophthalmos was as great and the bruit as marked as then. The lids covered the eyes with difficulty. No pulsation of the eyeballs or of the swelling at the upper inner angle of the orbits has been felt at any time. The right eye was about in the condition first noted, except that the opacity of her lens was greater. The left eye had, however, undergone a remarkable change. The conjunctiva was as before mentioned; the cornea was clear, *the anterior chamber was very shallow, the iris being almost in contact with the cornea.* The deeper part of the eye had not changed. T+ 1 (?) Very careful and frequently repeated examination of the cornea failed to discover anything obnormal in this membrane. The collyrium of boric acid and cocaine had been used quite frequently of late. The irregular compression of the carotid was continued, and the iodide of potassium was given as before mentioned.

Nine days later the anterior chamber of the left eye was again of normal depth. T n. The ocular conjunctiva of this eye was much less swollen, and the greatly enlarged tortuous veins which traversed this membrane some weeks before had largely disappeared. The right eye showed no marked change, though its anterior chamber seemed more shallow than that of the left eye. The protrusion of the eyeballs and the bruit continued as last mentioned.

November 15, (three months and eleven days after first visit) the patient joyfully informed me that the dreadful noise in her head and right ear had ceased two days previously, and auscultation failed to discover it in any part of the head and side of neck. Not a trace of the noise could be heard on the most

searching examination. The left eye has now returned to its normal position, its mobility is unimpaired. The upper lid is still larger than it should be. The œdema and congestion of the ocular conjunctiva have almost entirely disappeared ; otherwise the eye is as before. The right eye is as much protruded as formerly, indeed it seems even more bulged than it was since I last saw the patient. The upper lid is enlarged and red. The ocular conjunctiva is very œdematous and intensely congested. A wreath of enlarged veins around the cornea is especially conspicuous. The anterior chamber is very shallow. No change in other parts. T n. The globe does not pulsate, and no pulsation can be felt when the eye is pressed into orbit, nor in the swelling at the upper inner angle of the orbit. The compression of the carotid was discontinued, but the iodide of potassium is to be continued.

December 29. There has been no return of the bruit. The left eye is in normal position. Lids normal size. The eye is no longer injected. All enlarged vessels in the conjunctiva have disappeared. The right eye has now almost returned to its normal position. It is still a little more prominent than the left eye, but not enough to be noted by casual observers.

The swelling which formerly occupied the upper inner angle of the orbits has entirely disappeared on both sides. In its place is now occasionally felt a varicose vessel on the right side. The upper lid is no longer red, and is of nearly normal dimensions. The ocular conjunctiva is no longer swollen, and the enlarged vessels have disappeared, except a large one which proceeds from the outer canthus nearly to the margin of the cornea and then dividing into two branches nearly encircles the cornea. The anterior chamber is of normal depth. The lens is much more opaque than formerly.

June 6, 1888. There has been no return of the bruit. The right eye is still slightly more prominent than the left, which is in normal position. The mobility of both eyes is unimpaired in every direction. In the right eye, the enlarged conjunctival vessel above mentioned is still present, otherwise the

ocular conjunctiva is normal. This eye is now blind from cataract. Perception and projection good. The left eye is normal in appearance. The lens is also cataractous. The patient comes to-day to get relief for itching and burning of lids. The lids are a little puffy. The ocular conjunctiva is slightly œdematous, and of a dirty yellowish cast, and the limhus conjunctivæ is enlarged. On everting the lids, the palpebral conjunctiva is found succulent and swollen, and on its surface is studded with innumerable semi-transparent follicles. The condition is almost the same as that seen occasionally after the long continued use of atropia, except that the color of the conjunctiva is a yellowish red. The follicles are found on every part of the palbebral conjunctiva, but are most abundant and of largest size on the retrotarsal folds.

Having seen the same condition follow the long continued use of cocaine, I inquired as to what had been applied to the eyes and learned that a solution of cocaine, which I gave her many months before, had been instilled in both eyes several times daily ever since. No other remedy had been used. I prescribed a collyrium of zinc and stopped the use of the cocaine. Yesterday the follicles were greatly diminished in number, and the swelling of the conjunctiva had almost disappeared.

Remarks.—In this case the symptoms were probably due to a spontaneous rupture of the right carotid artery in the cavernous sinus. This supposition offers to me at least the most satisfactory explanation of the bilateral exophthalmos and the aneurismal bruit. The absence of pulsation of the eyeballs and of the swellings between the globes and the upper inner orbital wall, and the nearly normal size of the retinal veins were features also in several of the cases collected by Sattler in his exhaustive treatise on pulsating exophthalmos (Graefe & Saemisch Handbuch der gesammten Augenheilkunde, Band V.). That the intermittent compression of the carotid artery and the taking of small doses of the iodide of potassium contributed to the recovery I have, of course, no means of proving, but who can prove that these measures were of no ser-

vice? In view of the very small number of recoveries from this disease without ligation of the carotid artery (see Sattler, op. cit., page 922), I think I need not apologize for occupying your time with the recital of a single case.

Note.—Since the above was read I have successfully extracted the cataract of the right eye. The operation was done under cocaine on Oct. 5, 1888. As the tension of the eye was slightly increased an iridectomy was made. Only slight bleeding followed this step. The cocaine did not cause a relapse of the conjunctivitis and the healing was unattended by pain or injection or swelling of the ocular conjunctiva. The patient returned to her home on Oct. 19. The sight of the eye at that time was $^{5}/_{XXIV}$. Since then it has improved to $^{5}/_{XVIII}$.

GENERAL NEUROSES HAVING AN OPHTHALMIC ORIGIN.

BY H. BENDELACK HEWETSON, M. R. C. S.,
Ophthalmic and Aural Surgeon, Leeds General Infirmary; late House-Surgeon Leeds Public Dispensary.

Read in the Section of Ophthalmology at the Annual Meeting of the British Medical Association held in Glasgow, August, 1888.

It is now some years since I first observed symptoms, many and varied, occurring in neurotic persons who were also the subjects of uncorrected optically defective sight. In investigating more particularly the relationship between the various optic errors and sick headache, or simple headache, I was occasionally startled by the apparent direct relationship between the long uncorrected disorder (with all its immediate train of nervous disorders) and general conditions of ill health which seemed to be the direct out-come of a thus already demoralized nervous system. It is now well established that many cases of migraine or sick headache are directly attributable to the reflected irritation of the brain (and thence the gastric functions and heart's action) from some uncorrected optical state, chiefly on the side of hypermetropia, and always in a neurotic subject. It is also well proven that many of these cases are entirely relieved from their periodic attacks by the use of properly selected glasses; or, having passed an age when the activity of the accommodation ceases more or less, and the eye becomes presbyopic, the severity of the headache or migraine becomes greatly modified. It is further well known that a patient, the subject of hypermetropia, is liable, according to varying circumstances, such as extent of defect and use of eyes, to more or less constant "head pains", not necessarily

associated with very obviously defective vision, or aching eyes but always peculiar in their position and character, and aggravated by close application of the sight. Although I have very fully published my observations some time ago on the relations between sick headache and optical defects, and utilized what was previously discovered as to the relation between headache (broadly defined as such) and hypermetropia, I had not felt my footing sufficiently to enable me to bring forward that which is now my desire to show, namely, that the neuroses growing and arising from congenital optical error are more subtile in their nature, more varied in their distribution, and more demoralizing to the right evolution of the nervous system than I was first led to suppose.

I particularly wish it to be clearly understood I do not think all sick headaches come from an optic defect, for it is well known that decayed teeth, or central irritation of the ear or nose are frequently causes as well as other more general neuroses. But I have patients who have been martyrs to sick headache; who are also astigmatic; and in whom a complete cure has been effected by the use of the cylindrical lenses, showing that when sick headache and its accompanying dyspepsia is due to reflected irritation in a neurotic subject, from the eyes to the stomach, complete immunity from attacks of this kind may be obtained by glasses; and further, as I have observed, a very marked improvement in general cheerfulness and health. I may here remark that many persons who suffer from sick headache are astigmatic in an abnormal though slight degree and it is only by straining their eyes by looking long and hard at some fine object, or exercising such feats of sight-seeing as "doing" the National Gallery and the Academy in one day, or severe microscopical study, reading and the like, which will irritate the brain sufficiently to cause an attack. One patient says he always suffers from sick headache after watching a play; another actually brings on headache, vertigo, and vomiting by doing fine sewing; a third has sick headache only when reading for an examination; a fourth when she was at school, not since; but all proving to be ametropic, and com-

pletely cured by the systematic use of glasses constantly worn.

The most common forms of headache associated with that optical error known as hypermetropia are—either simply a heaviness or pain over the brows (this may or may not be combined with general headache,) or very frequently a tender place on the top of the head, making it particularly painful to dress the hair—such a pain as occurs after a lock of hair has been "slept on the wrong way," in common parlance; there is also frequently pain at the back of the head. All these pains may be present together, or they may exist singly, but they all occasionally occur in conjunction with severe neuralgia at the back of the neck. This I have frequently noticed, and where it occurred, whether associated with the other head pains or not, it, as well as they, soon disappeared with the systematic use of accurately adapted correcting glasses. The symptom of pain at the back of the head and neck is not one which has long been associated with optical defect, but I have now seen a sufficient number of cases to show without doubt that such may be safely regarded as one of the symptoms of (frequently latent) optical error, perfectly remediable by the use of glasses, and, when such, by glasses only.

Dr. Lauder Brunton wrote me that he has seen several cases of neuralgia of the back of the neck cured by glasses. It would not appear to need demonstration that with symptoms so severe and depressing to the general nervous system as are the various forms of headache—vertigo, which is associated with astigmatism: vomiting; possibly, as I have noted, palpitation, or neurotic dyspepsia between the attacks of migraine—other conditions should arise as a sequel in many constitutions. One which I particularly wish to draw attention to is insomnia. This particular symptam I observed in many cases the subjects of astigmatism. In one instance in particular, where the eyes had given much trouble during the examination period of an Oxford man's life, it was particularly remarked to me that after the astigmatic trouble was corrected by suitable glasses, with an equal amount of work, the insomnia, disappeared, and the whole physical and nervous state of the gentleman improved

greatly. One object of my paper will be to show what an important factor these optical errors are in, as it were, moulding during childhood and early life the nervous and constitutional state of the individual. As a proof of this I will quote two cases, both in ladies of education and refinement, which seem to give us some sort of clue to the possible effects on the constitution of persons who conscientiously struggle through a severe scholastic career with important optical errors entirely uncorrected.

The first case was that of a lady, aged 22, whom, some few years ago, I found to be the subject of compound hypermetropic astigmatism. Her health was not good, but she particularly complained of headache and general feelings of *malaise*. I corrected the astigmatism after very patient testing, since here great nervousness made it a very trying process for myself as well as the patient. There were other symptoms, such as would be ordinarily covered by the convenient but too easily accessible term hysteria, which showed itself in subjective pains at the back of the neck, tenderness of the spine, and frequently of the skin generally. There was no apparent lesion in any important organ, and she appeared to be the possessor of a greatly demoralised nervous system, which was easily overwrought, no matter what amount of moral pluck appeared to be put forth to resist an attack. After wearing the glasses for three years constantly her whole being seemed to change, so great was the relief. All headaches and difficulty in obtaining sleep disappeared, the appetite improved, and she became more companionable at home; but there was evidently, with all this improvement, a disordered state of the nervous system not yet removed; the tenderness of the spine remained more or less, and the health was still subject to variable and unaccountable fluctuations. I made up my mind that though the head pains had been so far cured by the use of glasses, yet the long struggle in pain and toil of educational work had so far damaged the peripheral nerves that some other means of cure must be attempted.

I could multiply instances in which varying degrees of this

kind of nervous demoralisation occurred; but generally there is either nerve-resisting power or neurotic recuperation sufficient to enable the individual to recover if the sight be fully corrected. I am perfectly convinced that until the sight had been corrected all such treatment as I have indicated would be useless. If carefully looked into, this appears to me to suggest some very important conclusions in relation to the community at large. I see children driven to their work although suffering from defective sight, constant headache, and restless nights, which result in great exhaustion of the nervous system, disturbance of the various functions of the body, and a disinclination to innocent and beneficial child-play, all of which is with perfect ease set to right by a correction of the optical defect which causes it. But supposing that a naturally nervous subject grows up under these conditions, the right evolution of the nervous system is undoubtedly endowed with morbid action, as well as the formation of the character disturbed. The causes are evident; the consequences, I believe, will be found in some of the neuroses which I have endeavored thus imperfectly to describe.

There are conditions and pains associated with these *head pains*, and commonly attributed by the patient to disease of the eyes, since the eyes are frequently affected. I refer to the pain in and around, due to carious teeth, and these pains are frequently coincident with other—if I may so call them—ophthalmic neuroses. The existence of apparently quiescent carious lower molars causes invariably a point of pain in the temporal region; but the upper molars, when carious—one or all it may be—cause pain above the outer part of the eyebrow of the same side. Decay of the incisors and canines or bicuspids, mostly quiescent in the mouth, commonly causes pain either in the eye or about the inner side of the orbit above the diseased teeth. The extraction of the offending teeth invariably removes the local pain. These conditions were so frequently referred to diseases of the eye, that it became necessary to localize pains in the head so as to correctly diagnose their origin, and hence reach the cause.—(*British Medical Journal.*)

TRANSLATION.

The following is part of a paper which was intended to be read by Prof. Zehender before the International Congress of Ophthalmologists at Heidelberg, and is published in *Klinische Monatsblætter fuer Augenheilkunde*, October, 1888.

I have mentioned before that I have a slight degree of astigmatism; I have not always had it, it has grown on me. When Donders published his papers on astigmatism and cylindrical lenses, and when Helmholtz said in his Physiological Optics (page 140): "The eye is not generally accommodated at one and the same time for vertical and horizontal lines lying at an equal distance from it," it was difficult for me, not to say impossible, to see the truth of it on myself. Indeed, sometimes I thought I saw a difference between the vertical and the horizontal lines, yet the next moment I found it was no longer the case. Of late I have made experiments with the eyes of younger colleagues whose faculty of accommodation was as yet in full power, and these have convinced me that by means of the accommodation the eye cannot only be adjusted for near and far objects, but that even astigmatic conditions of the refractive media may thereby be corrected, and that optic anomalies artificially produced may thus be overcome.

There seems to be no doubt that with a little exercise young persons with good accommodation are able to overcome weak cylindrical glasses, in a similar way as we can learn to overcome the action of prismatic lenses.

The question of the dynamic or accommodative astigmatism of the crystalline lens was again brought before the Congress at Heidelberg by Javal, but could not, on account of lack of

time, be fully discussed. It grants to the crystalline lens the faculty of neutralizing anomalies in the curvature of the cornea, of correcting the corneal astigmatism by astigmatism of the crystalline lens (under other circumstances of aggravating it).

This faculty conceded, we must further concede, that astigmatism of the lens, as well as myopia of the lens, may be acquired; that just as at first spasm of the accommodation, but finally real myopia will follow the wearing of strong concave glasses—if the experiment was made in early youth—it may be possible to produce real astigmatism by the wearing of cylindrical lenses. This is not the place to discuss the mechanism of this faculty. Yet, the discussions at the last Congress have shown sufficiently plain, that the explanation of the mechanism of accommodation is still a hypothetic one, and not much better founded than it was at the time when the function of accommodation was first discovered. We know for certain, that the shape of the lens changes,but we know very little of how this change is brought about, and we know still less, whether this change of shape is exclusively due to a change in the length of its radii of curvature, or whether, unconsciously, but voluntarily, its spherical shape can, perhaps, be changed into an ellipsoid or ovoid form. If we grant the latter to be possible, we concede at the same time the possibility of the formation of astigmatism of the crystalline lens during the course of life. Such a lenticular astigmatism would also be produced, if we could accept the theory, improbable as it is, that the muscle of accommodation possesses the power, not only to change the curvature of the crystalline lens, but also to give it an oblique position. Such a theory would be decidedly without foundation!

Let us, however, concede that astigmatism of the crystalline lens may be acquired during life, as has been undoubtedly the case in my eyes, and we naturally will inquire into the cause.

It is not likely that any one for the sake of experiment will make more than a very superficial investigation, whether wear-

ing cylindrical glasses will render astigmatic a non-astigmatic eye. However, spherical lenses, obliquely set, must be considered as equalling cylindrical lenses in their action. If, therefore, individuals wearing spectacles look obliquely through their spherical lenses, they do just what we would hardly do with cylindrical lenses for experiment's sake. That this is very frequently done, we may see daily. The patent spectacle-frames to which our attention was drawn at one time by Dr. Krueger (which had their independent predecessors in England, and perhaps also in other countries) were invented on the supposition, that looking obliquely through the glasses produces faulty images, and may even harm the eye. We, furthermore, see very often, that individuals, myopes especially, turn the head sidewise and purposely look obliquely through the edges of their glasses. It does not matter, whether this is merely a bad habit, or whether it is in order to make use of the stronger refraction of the edge of the lens inspite of the resulting distortion of the image, or whether finally in order to correct an already existing astigmatism,— we must suppose, that in this way in time astigmatism may and must be acquired, if it did not exist beforehand.

The *pince-nez* shape of glasses which of late has come too much in fashion is a similar instance. Observing the individuals wearing such glasses must make plain even to a non-professional eye, that these glasses sit often so obliquely on the nose, that we are forced to presume, that in this way the wearers must either see very indistinctly, or that there is some astigmatism already existing, and finally, if this latter is not the case, that after some time it may lead to the formation of astigmatism. It would in my opinion be worth while to see, whether the methods of wearing the glasses just mentioned, or similar ones, are not an etiological factor in the production of the lower degrees of astigmatism which are so frequent. I have not yet had a sufficient opportunity myself to collect enough of convincing observations.

I finally want to draw attention to one point which so far as I know, has not yet found the recognition it deserves, that is,

the direction in which the light strikes the spectacles when used for near vision.

When we use both eyes for work at 20 or 30 cm., the light coming from a point opposite the median line of the body falls obliquely upon the glasses which are parallel with the surface of the face. The angle between the rays and the glasses when the distance of the points of rotation is 55, 60 or 65 mm., is at a reading distance of 30 cm., equal to 5° or 6°, at a reading distance of 20 cm., equal to 8° or 9°. When the reading distance is still smaller this angle is increased in rapid progression, and is, for instance, at 15 cm., equal to 10° or 12°.

In order to get a more accurate view of this, I had a little mechanism constructed which enables me to determine pretty accurately the degree of indistinctness due to the obliqueness of the glasses.

The spectacle frame can be rotated around a vertical axis. The degree of the angle of rotation can be accurately determined. A lens is put into the frame. Then by means of a telescope standing behind it, and through the glass when in a normal position, a distant mark is observed (say fine vertical parallel lines) which lies exactly in the axis of the telescope. Then we see by what degree of rotation of the lens in the frame the image becomes blurred. A large series of experiments has shown, that with a glass of +3 D. an angle of 5° of rotation would produce a blurring.

From this we may assume that continued working with + glasses of 3 D. at from 25 to 20 cm., or still nearer, can produce astigmatism of the crystalline lens in consequence of the continued exertion to correct the blurring of the image due to the oblique incidence of the light by means of the accommodation.

This is a preliminary communication which I hope later on to be better able to prove. Meanwhile, perhaps, other colleagues will have occasion to make observations which may verify it, or do otherwise.

The consequence of this assumption with regard to prophylaxis would naturally be, that the glasses of spectacles for

near work must not lie in the same plane but stand at an angle with each other, corresponding to the distance of the object looked at; this angle must be the wider, the larger the distance of the points of rotation of the eyes, and the smaller the farther the object is removed.

For weak glasses, and when the object is not very near, the angle is, of course, very small; for very near work, however, my observations seem to be of great importance.

In the *Centralblatt f. Augenheilkunde* Prof. Hirschberg relates the following interesting case:

There are astonishing cases which we are ready to believe only when we have seen them ourselves. To this category belongs the following case in which by an embolism of a retinal artery sight was very considerably reduced, but brought easily back to the normal standard by simple friction.

At about 7 o'clock in the evening of October 18, last, a very nervous gentleman, about 52 years of age, called on me who, while on Change that afternoon, had noticed a headache, dazzling before the right eye and obscuration of vision in it. Having reached his house, he saw a phosphene like fireworks which lasted for several minutes, the loss of vision has remained. Although he had so far never shown any heart symptoms, I had to assume an embolism of one of the arteries of the retina. It was, however, impossible to see it with the ophthalmoscope, the examination being a very difficult one, since the patient did not keep his eye steady for a minute.

I instilled homatropine and tested his vision. The left eye was normal. The right eye could not recognize Sn. cc at 15′, and read with a+6 Sn. xxx at 6 inches. It showed a characteristic sector-shaped defect of the visual field which corresponded to almost the whole of the upper inner quadrant, its position tending towards the macula lutea. I then again examined it ophthalmoscopically. The lower outer branch of the central retinal artery (*art. temp. inf.*) was normal, even in color, for the distance of about four diametres of the papilla; then came a short piece of one-third the diameter of

the papilla in which the artery contained a brownish coagulum which appeared as a dark central line, while the parts nearest the walls of the vessel could be seen as fine white lines above and below. Then followed a little further on a perfectly dark-brown appearance of the artery and branches, which at different points became invisible so that it looked as if the artery was interrupted. I now saw also a very minute degree of oedema of the central parts of the retina, but the red point in the fovea centralis was not yet well defined. Pressure upon the eyeball elicited no special symptom on account of the restlessness of the patient. It appeared to me, that I could compress the upper branches of the artery, but not the lower ones.

I at once directed him t o turn the eye toward the nose and rubbed hard upon the posterior temporal part of the eyeball, until after about a minute's time, tears, pain, and phosphenes forced me to stop. The patient soon acknowledged, that he saw better; but, not feeling safe, I did not test his vision more carefully then.

While he walked home his vision became normal. When he returned the next forenoon the visual acuity, visual field and ophthalmoscopic image of this eye were exactly the same as in the healthy fellow eye. Of course, I do not know, whether this case might have got well if left alone, but I considered it imperative to make an attempt to cure it.

IN MEMORIAM.

ELKANAH WILLIAMS, M. A., M. D.

DIED OCT. 5, 1888, IN THE 66TH YEAR OF HIS AGE.

"We live in deeds, not years; in thoughts, not breaths; in feelings, not in figures on a dial. He most lives who thinks most, feels the noblest, acts the best."

If it is the object of the physician's life to benefit his fellow creatures and add to their comfort and happiness, and relieve them of the ills that flesh is heir to, it must be a source of great satisfaction to a man who has reached the zenith of his ambition to look back on his life and feel that he has accomplished this. There are many men in our noble profession who have been able to do this, but none more conspicuously than Dr. E. Williams, of Cincinnati, who recently passed away.

He started on the career which gained him so much honor and such a world-wide reputation against the advice of some whose opinions he sought. They did not take the broad view of the work of the specialist that he did, for at that time specialists, except surgeons, were hardly known. His aim was high, and he determined to lay the foundations of his life's work broad and deep, and, therefore, went abroad to study with the best teachers in Europe. His early practice was in Bedford, Ind., his native town, but he determined to make the eye a specialty and devote his time to it exclusively. He went abroad in 1882 which, as it proved, was a most auspicious period. Up to that time the interior of the living eye was almost a term incognita, as the means of diagnosis of intra-ocular diseases were very imperfect. General deductions from

objective and subjective symptoms were all that the best physicians could give. At this time Helmholtz was experimenting on the use of the ophthalmoscope which he had invented, and Dr. Williams studied its use in Vienna with Arlt and Jaeger, in Berlin with Von Graefe, and in Paris with Demarres, and soon acquired a proficiency in its use. It seems strange that he should have had the honor of introducing the ophthalmoscope to his London colleagues, Bowmann, Critchett, Wordsworth and others, and give them their first lessons in its use, and yet it is true; and they were generous to concede him this honor, as many a student who made their acquaintance will know.

Dr. Williams had a talent for language and acquired both French and German during the period of over two years, which he spent on the Continent, so that he was able to converse or write with ease in either language. His familiarity with those two languages was of immense advantage to him subsequently in communicating with his clients, as well as in taking advantage of the literature printed in French and German, which is so valuable. While abroad he was a constant attendant at the clinics which afford such rich material for study and observation, and familiarized himself with the most approved methods of treatment, both surgical and medical.

On his return to Cincinnati he began his life's work with many conditions against him. The profession had not yet been educated up to the point of encouraging a specialist, but a few warm friends in the city stood by him and gave him opportunities for showing his superior skill. His personal appearance impressed his clients favorably. His genial and expressive face bespoke the soul within. His kind and sympathetic voice, his careful and exhaustive methods of examination, his sound advice based on extensive experience, all impressed those who applied to him for advice most favorably. There was a personal magnetism about him which very few men possess. He enjoyed a joke or humorous story, and many a patient who entered his office with a lugubrious face was soon laughing in spite of himself. It was not many years before he enjoyed all the substantial evidences of his popularity that any

man could desire. He was fond of medical students and gave them every opportunity to see cases in hospital and clincal practice which would be of advantage to them. As a lecturer, he was fluent, clear and forcible. He spoke with ease and interspersed his lectures now and tnen with a story or joke, which was always enjoyed. Dr. Williams has the credit of delivering the first regular didactic course of lectures on the eye in this country as professor of ophthalmology in the Miami Medical College. He served for many years as oculist on the staff of the Cincinnati Hospital, and his devotion to the poor won him many warm friends. He was honored by the profession both abroad and at home. He was an honorary member of the medical society of Athens, Greece, and of the Society of Ophthalmology of the United Kingdom. He was President of the state medical society of Ohio in 1875, and in 1876 was chairman of the section of ophthalmology of the International Medical Congress. He received the degree of M. A. from Asbury University, Ind. (now Depauw), and the degree of M. D. from the medical college of Louisville, Ky.

Dr. Williams possessed a strong religious nature, and his devotion to his profession was only equalled by his devotion to his church. He had advantages as a pioneer in the profession which no one else can ever have, and his name is now more generally known than that of any other specialist. Many a pleasant recollection lingers around his name at many a home and fireside where his skill has made life more tolerable by saving or restoring the most precious of senses—the sight.

REVIEWS.

A Manual of Ophthalmic Practice. By Charles Higgins, F. R. C. S. E. With illustrations. Philadelphia; P. Blakiston, Son & Co.; $1.75.

This little manual, which is intended for students and general practitioners makes one more of the continually increasing number of short text-books on eye affections. It is as well adapted for the class of readers it is intended for, as most of them. It appears to us, however, to be somewhat behind the times, especially in the lack of application of modern pathology.

The Physicians' Visiting List for 1889. Philadelphia; P. Blakiston, Son & Co.

This well known and extremely handy visiting list does scarcely need any further recommendation. It is neat and well arranged and contains a great deal of valuable information.

Dioptric Formulæ for Combined Cylindrical Lenses, applicable for all angular deviations of their axes. With six original diagrams and one albertype plate. By Ch. F. Prentice. James Prentice & Son, opticians, New York.

Some time ago we had occasion to notice and highly recommend a treatise on simple and compound lenses by the same author. This second volume from his pen is of equal merit, and will well repay careful perusal.

The author, in his modesty, is afraid that his trying to instruct, he being an optician, may call forth unusual criticism. Surely he need not be afraid of such criticism. On the contrary, work like his is certain of being gratefully received, and he deserves every encouragement in his good work.

ALT.

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SPONTANEOUS CURE OF RETINAL DETACHMENT.

BY F. C. HOTZ, M. D., CHICAGO.

Read before the Chicago Society of Ophthalmology and Otology, December 10, 1888.

In July, 1885, a farmer, 74 years old, was brought to my office by his brother to see what I could do for his right eye. As far as he remembered he could never see much with the left eye: he had to depend entirely on his right eye which though always very near-sighted, enabled him to do his farm work until two months ago when the sight rapidly failed. He could then see the motions of my hand only in front and in the lower portion of the field; in the upper field there was no perception at all. Tension decidedly diminished, lens clear and vitreous free from opacities; the lower portion of the retina detached, gray and undulating with every movement of the eyeball.

The left eye exhibited a mature senile cataract; normal tension, good perception and perfect projection in every portion of the visual field; in short everything indicated a normal condition of its fundus and warranted a favorable prognosis for an operation except the patient's statement that he never could see much with this eye. But even assuming a certain degree

of congenital amblyopia to exist, I believed the patient had a better chance of recovering a useful degree of sight by an operation upon the cataract of the left eye than by any treatment of the right eye, in view of the fact that a retinal detachment in a highly myopic eye is generally admitted to be a pretty hopeless case.

I, therefore, proposed to leave the right eye alone and to operate upon the left eye giving the patient a full explanation of my reasons. He consented, and on July 24 the cataract was successfully removed; the patient being able to count fingers directly after the operation. Both eyes were bandaged, and the patient spent the day sitting in a rocking chair. The recovery was very rapid; after 10 days the patient could be discharged. But picture my surprise when on examining the right eye I found no trace of retinal detachment; the fundus absolutely normal in appearance, except a narrow crescent (conus); and $V=^{20}/_{LXX}$ with—4. One year later, in September, 1886, I had an opportunity to examine this case again; the detachment had not returned; sight had improved to $^{20}/_{L}$, and the re-attached lower portion of the retina had recovered its perception as shown by the measurements of the visual field extending upwards to 40°. And the same status was found at another examination made Oct. 10, 1887.

In the XI Vol. of the *Archives of Ophthalmology*, Prof. Schweigger reported four similar cases in which a detachment of the retina seen by himself at one time had disappeared at a later period though no treatment whatever had been applied, the patients not even changing their habits and mode of living. Such cases of spontaneous recovery from extensive detach ment of the retina are not common, but there is no doubt of their occurring occasionally; and it is advisable to keep this occurrence in mind when one is experimenting with a new treatment for this disease, lest he will too readily attribute to his treatment an occasional cure which in reality has been a case of spontaneous recovery.

Such mistakes in logic are committed and published every day. Suppose a surgeon has employed the same medical or

surgical treatment in 10 cases of detachment, and the result was one cure and nine failures; is it sound logic to attribute this one success to the mode of treatment? or is it not more reasonable to consider the 9 failures sufficient evidence of the insufficiency of the therapeutical efforts? Can we sanely believe in the efficacy of a remedy which fails nine times out of ten? Does an exception prove more than the rule?

In the eyes of some oculists, it seems, it does, or they would not think of recommending procedures against detached retinæ for which they have to show very few good results only, but a long list of failures. The last International Congress furnished a very good illustration on this point, when Dr. Galezowski dilated upon the merits of treating detachment of the retina by aspiration of the fluid under the retina. According to this statement he cured 4 cases out of 25, but he forgot to say whether these "cures" lasted one week or one year; nor did he show why the aspiration of the subretinal fluid should be more efficacious and successful than the withdrawal of this fluid by tapping or by the hypodermic syringe; for there is certainly no radical difference between aspiration and these latter procedures, either of which has accomplished some cures; but most of them proved to be so ephemeral that the most ophthalmic surgeons, I believe have lost faith in these operations. And when during the discussion one gentleman pronounced Dr. Galezowski's procedure "a real addition to the rational means at our disposal; a tremor of surprise must have run through the audience; and it is to be regretted that the gentleman was not requested to name some of those "rational means at our disposal;" for among all those I know there is none which deserves this designation in the light of our present knowledge of the pathology of retinal detachment.

The researches of Iwonoff, Leber, Nordenson and others have clearly shown that the detachment of the retina is preceded and induced by a shrinkage of the vitreous humor. As the sclera is too rigid to adapt itself to the reduced bulk of the vitreous humor this body in shrinking will either detach itself from the retina (detachment of the vitreous,) or the latter will

follow the receding vitreous and become separated from the choroid, if the connection of the retina with the vitreous is firmer than that between the retina and choroid. The space which separates the detached retina from the choroid must, of course, be filled by something; and thus it is obvious that the subretinal fluid is but the necessary physical consequence of the primary pathological shrinkage of the vitreous. But if this view is correct we must regard as irrational every therapeutical effort which is directed against the subretinal fluid for the purpose of curing a detachment of the retina. Unless we can stay the skrinkage of the vitreous the removal of the subretinal fluid cannot be of any lasting benefit; and could we remove that which makes the vitreous shrink, could we restore the normal nutrition of the vitreous so that it would recover its normal size, the subretinal fluid would most likely be absorbed under the increasing pressure by the vitreous, and thus the retina would become re-attached without any operative interference. And I am firmly convinced the successful treatment (if ever we shall find one) of retinal detachment will never be an operation directly attacking the detached retina and the subretinal fluid.

A CASE OF INSUFFICIENCY OF THE INTERNI IN WHICH AN EXTERNUS WAS CUT BY DR. C. R. AGNEW.

REPORTED BY DR. D. WEBSTER, NEW YOEK.

Arthur H., æt. 17, came under observation on Sept. 28, 1874. He had been, for some time, studying hard, preparing for Yale College. His eyes had been weak for two or three years, but gave out entirely only a few days before we saw him. He had been in the habit the preceding winter of rising at 4 o'clock and studying by bad gaslight.

Upon testing his eyes we found that each had vision $^{20}/_{xx}$, and was apparently emmetropic.

Ophthalmoscopically we found no lesion, physiological excavation of both optic disks and apparent emmetropia.

Tested with prisms and candle he showed insufficiency of his interni 12° at 20′, 21° at 1′.

On approaching an object of fixation to the eyes, the left internus would give way, and the left eye would slowly turn out.

Feb. 2, 1875. Insufficiency of interni 12° at 20′, 15° at 1′. V. $=^{20}/_{xx}$. E. both. Ordered atropia.

Feb. 3. After four instillations of a 4 grain solution of sulphate of atropia extending over sixteen hours, V. $=^{20}/_{xx}$, each without a glass. The patient reads all of $^{20}/_{xx}$ *less clearly* with $+^{1}/_{72}$, $+^{1}/_{60}$. or $+^{1}/_{48}$. Glasses $+^{1}/_{48}$ were now ordered for all near work.

April 10. Insufficiency of interni 12° at 20′, 12° at 1′.

Feb. 21, 1877. Insufficiency of interni 13° at 20′, 15° at 1′.

March 9. Insufficiency of interni from 11° to 16° at 20′, 15° at 1′.

March 10. Tenotomy of left externus under ether.

March 13. No insufficiency. The patient was troubled with diplopia for a short time the next morning after the operation.

Mar 14. Insufficiency of interni 1° at 20′, 0° at 1′.

March 22. No insufficiency for near or for far.

April 4. Insufficiency of interni 12° at 20′, 8° at 1′.

April 6. Insufficiency of interni 9° at 20′, 4° at 1′.

The patient states that the second week after the operation his eyes felt well and he could read the newspapers without discomfort. For the last week they have been getting steadily worse. They "make him stupid" after reading a short time, or on exposure to gaslight.

The patient was now put upon reading tasks by Dyer's method.

April 11. Insufficiency of interni 8° at 1′, 8° at 20.′.

There are no further notes in this case, but I am under the impression that the patient was only partially relieved, as the insufficiency was only partially corrected.

So high a degree of insufficiency is uncommon, I think, in eyes that are emmetropic.

DETACHMENT OF THE RETINA IN THREE SUCCESSIVE GENERATIONS OF ONE FAMILY.

BY ADOLF ALT, M.D.

On the 11th of July, 1887, A. H., 49 years of age, consulted me about his right eye. His statement was, that during the week preceding this visit he had gradually lost the sight of the right eye without his knowing any possible cause for it.

I found vision reduced to fingers at two feet outwards and upward; straight forward to perception of light. —T. The visual field was reduced to a small area up and outward. The retina could easily be seen floating in the muddy vitreous. The left eye was found to be emmetropic and presbyopic.

The patient stated that his mother had lost an eye in a similar way, and, furthermore, that his right eye had always been weaker (probably myopic.)

Rigid rest of eye and body, injections of pilocarpine and sublimate internally seemed for a time to bring about an improvement. The visual field became considerably larger and he counted fingers at seven feet 2 weeks after the first examination. Yet, as soon as he sat up for even a short time, the former condition returned, and considering the case incurable I discharged the patient. His eye has since remained the same.

On the 19th of September last, I was consulted by Mrs. N. L., 18 years of age, the daughter of A. H., on account of sudden loss of vision in her right eye the day before. Standing on a chair she had fed a canary bird, and when stepping down she got suddenly very dizzy and blind in the right eye. She had been married two months and was pregnant. She was always myopic and wore glasses.

I found vision reduced to $^{2}/_{cc}$ excentrically. —T. Visual field upward, outward and inward wanting. The ophthalmoscope showed a corresponding detachment of the retina, which latter was, however, not far enough detached to be floating.

Rigid rest of eyes and body, injections of pilocarpine and hydrargyrum tannicum internally at once brought about an improvement of the conditions. Six days after the first consultation, the visual field had almost the normal area. The retina was everywhere reapplied to its natural support and although a little shadow is yet complained of upward and outward the ophthalmoscope does no longer show anything abnormal.

Detachment of the retina having thus occurred in the father and daughter, I became doubly interested in knowing exactly what disease had rendered Mrs. N. L.'s grandmother blind.

The following portion of a letter by Dr. G. Strube, of Bremen, Germany, made it certain, that she also had suffered from detachment of the retina. The doctor writes: "I saw Mrs. H. in 1858. She had then been in Berlin and under the treatment of von Graefe. According to his statement there was detachment of the retina in a myopic eye. Iritis and total posterior synechia had supervened and von Graefe had made an iridectomy. After this the inflammatory symptoms had ceased. The eye remained unchanged, except for the development of a cataracta accreta, until her death which occurred about ten year later."

Thus undoubtedly mother, son and grand-daughter in direct succession became subject to detachment of the retina.

THE BOWMAN LECTURE ON THE VALUE OF EYE SYMPTOMS IN THE LOCALIZATION OF CEREBRAL DISEASE.

BY HENRY R. SWANZY, A.M., M.B., F.R.C.S.,

Surgeon to the National Eye and Ear Infirmary. Dublin; Ophthalmic Surgeon to the Adelaide Hospital, Dublin.

Delivered before the Ophthalmological Society, Nov. 9, 1888.

Mr. President and Gentlemen.—Recent advances in cerebral surgery have brought with them, in some respects, increased responsibility, and increased anxiety for the surgeon, in cases of focal cerebral disease. In these cases perhaps the gravest responsibility and anxiety is encountered at the very outset, when the regional diagnosis has to be made. It is true that our present knowledge of the anatomy, physiology, and pathology of the brain frequently enables us to diagnose the position of focal lesions; but it must be confessed there remains much to be learned before we shall be able to say, that in all of the cases met with localization can be successfully effected. Yet we may confidently hope that the difficulties which still beset this subject will gradually disappear; and we are encouraged to think so by contemplation of the marvellous progress which has been made in cerebral physiology within the last eighteen years.

In order that the desired end may the sooner be attained, it is of the utmost importance that the symptoms of each case of focal cerebral disease should be carefully noted, and that each necropsy should be conducted with the greatest precision; and in looking over the records of such cases, one cannot help observing that it is just in respect of the necropsy that most of them are defective. I do not mean merely that

in many of the cases which ended fatally no necropsy was, or probably could be, made, but also that in many instances where a post-mortem examination was obtained the record of it affords only scant or inaccurate information as to the seat and extent of the disease.

I feel sure we shall see quicker and better progress in cerebral localisation when many physicians and surgeons recognize more fully than they yet have done, that the interests of science, as well as their own reputations, are best served by entrusting the examination of the brain in all these cases to skilled pathologists and microscopists, rather than by undertaking the necropsies themselves; for it must, I think, be admitted that the successful examination of a diseased brain requires special training. The mere fact that marked focal symptoms may be caused by minute cerebral lesions is sufficient to demonstrate the importance of this view, without dwelling upon it further.

In the meantime, while our knowledge of the physiology and pathology of the brain is gradually increasing, we must be careful in our daily practice to employ all the facts which have hitherto been acquired concerning this interesting organ; and it has occurred to me that it might serve a useful purpose were I to occupy the time at my disposal this evening in reviewing the symptoms which are derivable from the eye in cases of focal cerebral disease, and in considering how far they may be utilized for the localization of cerebral lesions. I incline to the opinion that these eye symptoms are not as much valued as they should be, perhaps because their often subtle and sometimes subjective nature renders them less readily studied than are other focal brain symptoms.

I also incline to think that eye symptoms are too often not looked for at first, but utilized rather as a *dernier ressort*. This is a serious error, for many of these symptoms are of the highest localising value; while their very nature may render their discovery in a late stage of the disease impossible. How, for example, can a field of vision be examined in a late stage of tumor of the brain when the patient is racked with pain, delirious or half unconscious?

And if it be remembered what a prominent *rôle* in cerebral regional diagnosis the process of exclusion must necessarily play, and what a very large extent of the brain is placed in relation to the eye, it will be admitted, that when a search for eye symptoms in a case of focal brain disease gives only a negative result, yet the significance of this for the diagnosis falls little short of that which belongs to a positive result.

In endeavoring to accomplish the task I have set before me, I invite your attention to the facts provided for us by clinical pathology, rather than to those of experimental comparative physiology. For, important as are experiments upon animals for our knowledge of the physiology of the human brain, yet no one will deny that the evidence of the bedside and of the post-mortem table, when it can be obtained, is of even greater importance. You will understand, then, why it is that I refer but little in the following to the epoch-making researches of such distinguished men as Ferrier, Schaefer, Victor Horsley, Hitzig, Munk, Flechsig, Goltz, and many others.

Gentlemen, in the details of this lecture I can hardly hope to offer anything that is new to you, yet I trust that in this respect you will extend to me your indulgence, and that you may be able to find at least some interest in the presentation of the subject as a whole.

In estimating the localising value of the focal eye symptoms which may be afforded by a given case of recent brain disease we are immediately confronted with a difficulty which is common to all focal symptoms, the difficulty, namely, of distinguishing between direct symptoms and the so-called indirect symptoms; the former, as you are aware, being those which depend upon the loss of function of the part in which the lesion is situated, and which, consequently, are the symptoms it is desirable to point out, while the indirect symptoms are not the result of the local disorganization caused by the lesion, but of its pressure, of disturbances of circulation to which it gives rise, and, it is also thought, of inhibition effects, all of these being liable to interfere with the function of parts of the brain more or less distant from the lesion.

I agree with Dr. Gowers in thinking that the term "indirect" conveys a false conception of the nature of the symptoms to which it is applied, and I venture to suggest to you in its place the term "distant symptom" as being more suitable. It is an adaptation of the *Fernwirkung* of some German writers, and implies, I think, the one fact of which we are certain in connection with these symptoms, and no more.

We may at once say that there is nothing in the manner in which focal eye symptoms present themselves which can enable us to distinguish between the direct and distant symptoms. It is only in cases of stationary lesions, which remain under observation sufficiently long—some six weeks or more —after the first onset, that we can feel pretty sure that the symptoms before us are direct symptoms; for, after that interval, it is probable that the distant symptoms, if any have been present, will have passed away. But, in the case of a tumor, which constantly and slowly increases in size, distant symptoms may come and go, and then we can often only recognize the direct symptoms by their greater constancy. No doubt some symptoms are more often distant than others, and it will be my duty, as I go along, to endeavor to point out those which seem to be, respectively, the most and the least prone to be distant.

The opposite of those cases, in which not only direct but also distant focal symptoms are present, is afforded by cases where the lesion is latent, where it gives rise to no focal symptoms whatever. There is probably no part of the brain in which a destructive lesion may not be present without producing any focal symptoms, and this is one of the most remarkable facts connected with cerebral disease. Here the presence of diffuse symptoms renders the existence of focal brain disease indubitable, while the absence of focal symptoms renders localisation of the disease impossible. Lesions in those parts of the brain which, as a rule, give rise to eye symptoms, may sometimes be latent, like lesions elsewhere. Marked disease, for example, in the occipital lobe, in the internal capsule, in the cerebral peduncle, and so on, may fail to produce the

accustomed eye symptoms, or any others. It was necessary that I should refer to this interesting point, but its further consideration does not come within the scope of this lecture.

Focal eye symptoms may be divided naturally into those which depend upon disturbances in the motor apparatus of the eyeball, including the intraocular muscles, and those which depend upon disturbances in the special visual apparatus. We have also to consider symptoms due to lesion of the nerve of ordinary sensation of the surface of the eyeball.

And, first, as regards the symptoms derivable from the motor apparatus. In the cerebral cortex, centres exist for the motions of the face, arm and leg, respectively, but no centre, in precisely the same sense, for the motions of the eyeball is present; that is to say, there is no centre in the cortex of one hemisphere a lesion of which will produce ophthalmoplegia, partial or complete, of the opposite eyeball alone, although attempts have been made to describe some such centres. All are agreed that the reason for this is, that the two eyes being associated in their motions, it is only those associated motions which are represented in the cortex.

By far the most common derangement of these associated ocular movements, as the result of cortical lesions, is the conjugate lateral deviation of the eyes to one side—that is, abnormal function of the internal rectus of the one eye, and of the external rectus of the other eye. In paralysis, the deviation being, of course, toward the side of the lesion, the eyes look at the cerebral lesion, as Prevost has expressed it; and in spasm, from the side of the lesion. In many of these cases, if the patient's intelligence be not impaired, the eyes can be moved as far as the middle line, or even further by an effort of the will. We are not able, as yet, to say where the cortical centre for these motions resides in man, for Grasset's statement[1] that it is situated in the supra marginal and angular gyri has not been verified.

But, did we know its position, it is not likely that much

[1]De le Deviatio n Conjugée, Paris, 1879.

would be gained, so far as clinical localisation is concerned, for this centre seems to be extremely sensitive, and to be easily thrown out of gear by lesions of many different parts of the cortex. Conjugate deviation is, in short, very apt to be a distant symptom, especially in cerebral hæmorrhage, when it is often accompanied by a rotation of the head in a corresponding direction, and lasts only a brief time. Moreover, it is thought that, when this centre may happen to be actually involved in the lesion, its function, being largely bilateral, is rapidly taken up by the opposite hemisphere ; and hence, even when conjugate lateral deviation plays the part of a direct cortical symptom, it can never be recognized as such, owing to its evanescent character.

Again, conjugate lateral deviation similar in character to that caused by a cortical lesion may proceed from a lesion of the internal capsule.

This same symptom, finally, may be caused by a lesion of the pons, involving the special nucleus for the associated motion, which is common to the sixth and third nerves, although distinct from their proper nuclei, and which probably resides in the superior olivary body. But conjugate deviation from a lesion in this locality differs from the same symptom in a case of lesion of the cortex, or of the internal capsule, inasmuch as the eyes are here turned away from the side of the lesion, toward the hemiplegic side of the body, in paralysis, and toward the side of the lesion, away from the convulsed side of the body, in irritating lesions. Gowers, in his recent exhaustive work on "Diseases of the Brain,[1]" points out that in these pontine lesions the symptoms vary according as the disease does, or does not involve the nucleus of the sixth nerve. In the first place, if the disease is above the nucleus of the sixth nerve, that is, at or in the neighborhood of the superior olivary body, the eyes cannot be moved toward the side of the lesion beyond the middle line, but in some cases, although the associated movement is lost, yet convergence can

[1]Page 167.

be effected. But, if the very nucleus of the sixth nerve be involved, there is complete loss of power of the external rectus, so that the eye deviates inward, and cannot be rolled outward, while the other eye can be moved by its internal rectus as far as the middle line and no further. Attention was first drawn to this form, I think, by Broadbent.[1] In it the facial nerve, on the side of the paralyzed sixth nerve, is often also paralyzed, owing to the proximity of its fibres to the nucleus of the sixth nerve; or because the sixth and portio dura have a common nucleus. Finally, if the fibres of the sixth nerve in the pons, after they have left their nucleus, be injured, the external rectus is paralyzed, but the associated internal rectus of the other eye is not impaired in its function. Conjugate deviations due to pontine lesions differ again from those due to cortical or capsular lesions, in that they are almost always direct symptoms. Doubtless the reason for this is, that the close proximity of the two nuclear centres for the associated lateral motions of the eyes to each side, respectively, lie so close together that a distant effect can hardly be produced upon one of them alone. Yet if both nuclear centres should happen to be paralyzed, we must not at once conclude that the resulting symptom is a distant one, for, according to Wernicke,[2] cases of simultaneous focal lesion of both of these centres have been observed. The clinical appearance is then very peculiar, the eyes being directed straight forward, and being absolutely immovable to the right or to the left, while their upward and downward motions are preserved, as well as the motions of the upper eyelids.

Conjugate lateral deviation of the eyes, then, may assist us in the diagnosis of a cortical or of a capsular lesion from one in the pons. It may aid us in deciding in which side of the brain a lesion is situated when other symptoms are not readily observed, as in coma. And the varieties of the symptom, when it is due to disease in the pons, may enable us to form a refined diagnosis as to the precise seat of the lesion there.

[1]Medical Times and Gazette, 1872, vol. I.

[2]Lehrbuch der Gehirnkrankheiten Bd. i, p. 353.

As regards loss of other associated motions of the eyeball, an interesting case of loss of motion of the eyes upward has been recorded by Gowers,[1] in which a small tumor was found 174, foot note.
in the middle line behind the posterior quadrigeminal bodies, damaging them slightly, as well as the velum and the adjacent part of the inferior vermiform process of the cerebellum. In a case of tubercle of the corpora quadrigemina, Henoch[2] observed this same defect as the first focal symptom to make its appearance.

Paralysis of the upward and downward motions of both eyeballs, sometimes with ptosis, while the lateral motions are unimpaired, may be the result of a focal lesion involving the third nerve nuclei in the floor of the Sylvian aqueduct; and, if attended by hemiplegia, the lesion involves the pyramidal tracts, probably at the level of the anterior quadrigeminal bodies, the posterior commissure, and the neighboring part of the optic thalamus. Lang and W. A. Fitzgerald reported a case to this society[3] in which this symptom and hemianopsia were the two focal signs. The case rapidly recovered, leaving only homonymous insular scotomata. In their communication the authors do not profess to have localised the lesion accurately, but I think this combination of symptoms might be accounted for by a lesion involving the pulvinar and anterior corpora quadrigemina.

Loss of the power of convergence, accompanied sometimes, as in Eales's interesting case,[4] by paralysis of accommodation, is a symptom of lesion of the posterior quadrigeminal bodies. Probably, however, this symptom is occasionally a distant one, for there are three cases published, one of them by Senator,[5] in which the lesion was in the pons, and did not involve the corpora quadrigemina.

[1]Medical Ophthalmoscopy, 2d Ed., p. 340, and Diseases of the Brain, 1888, p.

[2]Berl. Klin. Wochenschr., 1864, No. 13.

[3]Trans. Ophth. Soc., vol. ii. p. 230.

[4]Trans. Ophth. Soc., vol. iv., p. 300.

[5]Arch. f. Psychiatrie, Bd. xiv, p. 644.

A symptom which is the very opposite of conjugate deviation or paralysis may be best referred to here. It consists in a deviation of one eye downward and outward, while its fellow is turned upward and and inward. This remarkable, and, as yet, wholly inexplicable, symptom has only been seen with lesion of the middle cerebral peduncle, and the lesion may or may not involve the neighboring cerebellar substance. The last-mentioned symptom, as well as loss of power of the upward, or of the upward and downward motions of the eyeballs, are almost always direct symptoms.

We have now to consider the localizing value of those paralyses of the cranial nerves for the supply of the motor apparatus of the eye other than conjugate paralyses.

As regards the third nerve, we are at once struck with the fact that ptosis, partial or complete, may be present as a focal symptom in cortical lesions—cerebral ptosis, as it is called—without any other third nerve branch being paralyzed. That a separate cortical centre for this branch of the third nerve exists, and that it innervates the muscle of the opposite side, is very probable. The existence of such a centre would not be inconsistent with the view that, as regards the motions of the eyeballs, associated centres alone are present; for, although as a rule, the elevators of the lids are associated in their motions, yet by an effort of the will most people can throw one of them into motion separately, or more than the other. No doubt the power to voluntarily innervate one levator and orbicularis alone varies in different individuals, and Wernicke[1] leans to the opinion that in many persons the levator centres are practically associated centres, and that is the reason why cerebral ptosis is rather rare. The position of this centre is still an open question, for the view of Landouzy that it is situated in the posterior part of the inferior parietal lobule has not met with acceptance.

Ptosis, then, has no value as indicating the locality of a lesion in the cortex; but, according to Nothnagel,[2] it may be of

[1] Loc. cit., Bd. i, p. 323.

[2] Topische Diagnostik der Gehirnkrankheiten, p. 454.

use in distinguishing a cortical lesion from one situated elsewhere in the brain, for monolateral ptosis, as the only focal symptom, occurs with cortical lesions alone.

It is probable that ptosis, as the result of a cortical lesion, is a distant symptom in not a few of the cases where it is present.

Double ptosis was seen by Steffan[1] as the only focal symptom in a case of tubercular degeneration of the corpora quadrigemina, the neighboring parts of the brain being absolutely uninvolved in the lesion. It is interesting to note that in this case the motions of the eyeballs were not impeded, nor was there any defect of vision.

It is evident that lesions causing bilateral paralysis of branches of the third nerve which are wont to be innervated together—loss of motion of the eye upward, of motion of the eye downward, of convergence, and double ptosis—are to be sought for in the quadrigeminal bodies. Basal lesions do not give rise to similar paralysis.

Ptosis on the side of the lesion has occasionally formed a symptom in disease of the pons, without paralysis of the other branches of the third nerve—except, sometimes, in so far as conjugate deviation is concerned—and without the third nerve being involved in the lesion. An interesting case of this kind has been published by Wernicke.[2] Both upper lids drooped, the left more so than the right; there was also conjugate lateral deviation of the eyes to the right, the left eye being turned more inward than the right eye was turned outward. On an effort to look to the left the left eye did not move at all, while the right eye only reached the middle line. The whole of the left facial nerve was paralyzed, and sensation on the right side of the face and head was dull. These were only the focal symptoms, and they continued until the patient's death. At no time was there any paralysis, either of motion or of sensation, in the extremities. The carefully

[1]Berl. Klin. Wochenschr., 1864., Bd. vii, p. 513.

[2]Archiv f. Psychiatrie und Nervenkrankheiten, Bd. vii. p. 513.

made necropsy showed a tumor in the floor of the fourth ventricle, a little to the left of the middle line. Toward the left it did not extend beyond the lateral boundary of the pons; its posterior edge reached within $1^1/_2$ cm., of the calamus scriptorius, and its anterior edge was 1 cm., from the corpora quadrigemina, while the width of the tumor was 2 cm. The growth did not involve the middle peduncle of the cerebellum, but it did extend into the inferior cerebellar peduncle. The rest of the brain was normal. The zone of nerve tissue surrounding the tumor was free from all pathological changes, nor were there any traces of pressure in the pons or in the medulla. The upper half of the tumor was found to have involved, on the left side, the nucleus said to be common (Stilling) to the facial and sixth nerves. The nucleus of the small motor root of the fifth nerve on the same side had suffered, and the fibres of the descending root of the right fifth nerve had been interrupted. The lower part of the tumor had destroyed a large part of the facial nucleus, and a great part of the internal and external auditory nuclei, and the upper end of the glosso-pharyngeal nucleus. The nuclei and fibres of the third nerve were not in any way implicated in the lesion. It is as yet impossible to explain the occurrence of ptosis in this and other such cases—they have all been cases of tumor—unless we regard it as a distant symptom. It is important to note that in each of these cases paralysis of the facial was a constantly associated symptom. Consequently, in this combination, even if it should be a distant symptom, ptosis may have some localising value.

Again, ptosis, by forming a factor of a crossed paralysis, may serve to localise a lesion in the crus cerebri. When the third nerve is paralysed by a lesion in this situation, it is the rule to find it paralysed as a whole, but paralysis of only some of the third nerve branches may be produced by a lesion of the cerebral peduncle, and the branch to the levator palpebræ seems to be the one most frequently implicated alone. A case of this kind was published by Dr. Rickards,[1] in

[1]Journal, 1886, vol. i, p. 774.

which there was loss of motion and sensation of the left side of the body, with ptosis of the right eye ; later on, ptosis in the left eye appeared. The necropsy discovered a hæmorrhage of the size of a hazel nut occupying the upper and inner surface of the crura cerebri, but involving chiefly the right crus.

Another important case of this kind (important especially on account of the accurate necropsy) was published last year by Professor Leube.[1]

In order now to complete this subject of ptosis as a focal symptom, I must refer to a rare form of it which has been described by Nothnagel,[2] and which does not depend on a lesion of the third nerve. It may be called sympathetic, or pseudo-ptosis, and is accompanied by other eye symptoms as well as by symptoms of vasomotor paralysis of one side of the body, such as elevation of temperature and redness and œdema of the skin. In these cases, this author says, there is—1. Apparent ptosis on the paralyzed side, owing to the contraction of the palpebral aperture, but the lid can be raised. 2. Contraction of the pupil on the same side. 3. A shrinking back of the eyeball into the orbit, so that it seems to have become smaller. 4. An abnormal secretion of thin mucus from the corresponding nostril, of tears from the affected eye, and of saliva from the corresponding side of the mouth. Nothnagel states he had found this train of symptoms in lesions of the corpus striatum.

A common sign of disease of the crus cerebri is what is known as crossed hemiplegia. Paralysis of the third nerve on the side of the lesion, with hemiplegia, hemianæsthesia, often facial, and sometimes hypoglossal, paralysis of the opposite side of the body, is a frequent form of it. The lesion may implicate all the branches of the third nerve or only some of them. I have already given an instance in which only the branch to the levator palpebræ is involved. But the localising

[1]Deutches Archiv f. Klinische Medicin. Bd. xl, No. 2, p. 217.

[2]Loc. cit. p. 327.

value of crossed hemiplegia, as Hughlings Jackson long ago pointed out,[1] depends chiefly on the hemiplegia and paralysis of the cranial nerve coming on simultaneously. If they occur at different times, they may be due to two distinct lesions, neither of which may be in the crus; for the hemiplegia might be due to a lesion in the hemisphere, and the third nerve paralysis to a basal lesion of earlier or later date. Yet a few cases have been observed where, with a lesion in the cerebral peduncle, the third nerve paralysis preceded the hemiplegia by a considerable interval.

That basal lesions are by far the most frequent cause of paralysis of the third nerve is beyond a doubt; and here it is usual, but not constant, to find it paralyzed in all its branches. The diagnosis to be made, when direct symptoms are being considered, is, for the most part, between a lesion in the crus and a lesion at the base. We cannot pretend to be able to make this diagnosis with certainty in all cases. Complete paralysis of every branch of the third nerve without any other paralysis is almost always basal, so also, as Graefe pointed out, are those cases in which, where there is hemiplegia, it is slight as compared with the degree of the third nerve paralysis; and those cases, too, to which I have already referred, where there is an interval between the onset of the paralysis of the extremities and of the third nerve, are apt to be basal. Of course, there may be such a combination of paralysis of the other cerebral nerves with that of the third nerve as to leave no doubt with reference to the basal position of the lesion. But into all this I need not here enter.

Third nerve somytoms—in addition to those included under the headings conjugate deviation, or paralysis and ptosis—are sometimes distant symptoms. Tumors of the cerebral hemispheres, more particularly if accompanied by violent general head symptoms, indicating probably high intracranial pressure, are the lesions most apt to produce these distant third nerve symptoms. As a rule, the slighter the general cere-

[1]Lancet, Sept. 6, 1873.

bral symptoms are, the more likely are the third-nerve paralyses to be direct symptoms. This rule, indeed, applies to other, as well as to third-nerve, focal symptoms.

Paralysis of the fourth nerve, when combined with paralysis of other motor eye nerves, is difficult to recognize; and consequently, in such cases, it supplies but little aid for localisation. Solitary paralysis of this nerve, as a symptom of cerebral focal lesion, is extremely rare. Nieden has placed a case on record[1] in which paralysis of one fourth nerve was the only focal symptom to which a tumor of the pineal gland, of the size of a walnut, gave rise. But the isolated fourth-nerve paralysis is more apt to be produced by a basal lesion. In combination with paralysis of the third nerve it speaks for a lesion in the cerebral peduncle, extending back to the valve of Vieussens, and has, I believe, been utilised by Meynert in this sense.

Paralysis of the sixth nerve associated with paralysis of the internal rectus branch of the third nerve has been already considered. When paralysis of the sixth nerve occurs as the only focal sign, it is probably due to disease at the base, or it is a distant symptom. I think I am correct in stating that there is no cranial nerve so liable to provide a distant symptom as the sixth. Gowers refers this liability to the lengthened course these nerves take over the most prominent part of the pons, which renders them readily affected by distant pressure. One or both nerves may in this way be paralysed. I was recently consulted in a case in which there were diffuse cerebral symptoms, which left no doubt as to the presence of an intracranial tumor. The only focal symptoms were complete paralysis of the left external rectus muscle, and very slight loss of motion upward of the eyeball, and these had been present for only a few days. On one occasion, for a few minutes, there had been a tingling sensation in the left index finger. The shortness of the duration of the sixth-nerve paralysis rendered it, for the time, useless as a localising symptom

[1]Centralblatt f. Nervenheilkunde, 1879, No. 8.

and that it was really only a distant symptom seemed not unlikely from the fact that, as I was informed, there had been a few days previously paralysis of the right internal rectus, of which now there was no trace. Wernicke[1] states that sixth-nerve paralysis is most apt to be present as a distant symptom, when the lesion, especially a tumor, is situated in the cerebellum: differing in this way from the third nerve, which, as I have said, is more likely to give distant symptoms with a lesion in the cerebral hemisphere.

Paralysis of the sixth nerve, simultaneous in its onset with hemiplegia of the opposite side of the body, indicates a lesion in the pons, usually a hæmorrhage, on the side corresponding to the paralyzed nerve. We know that the fifth and facial, and sometimes the auditory, spinal accessory, and hypoglossal nerves, may all, in varying combinations, form one of the elements in a crossed paralysis from a lesion in this position; but, in the opinion of Nothnagel,[2] if special localising value is to be given here to the participation of any one cranial nerve, that nerve is the sixth. The paralysis of this nerve, simultaneously with palsy of the opposite side of the body, while other conditions point to an intracerebral lesion, speaks then almost certainly for pontine disease.

Paralysis of the facial with the sixth is not an uncommon combination caused by a lesion in the pons, which at the same time produces hemiplegia of the opposite side of the body. This combination is a natural one, in view of the close relations of the nuclei of the sixth and seventh nerves. Indeed, Lockhart Clarke, Meynert, and others, as you are aware, are of opinion that there is one nucleus which is common to both nerves, a view not shared in by Gowers and others. The manner in which the root of the facial nerve winds round the sixth-nerve nucleus must also have an important bearing on the occurrence of associated paralyses of these nerves.

Hemiplegia due to a lesion of the cortical motor region,

[1]Loc. cit. Bd. iii, p. 369.

[2]Loc. cit. p. 19.

which might happen to be combined with paralysis of the sixth nerve as a distant symptom, offers no difficulty in its diagnosis from hemiplegia with sixth-nerve paralysis in pontine disease; for while the latter is a crossed paralysis, the former is homonymous.

Lagophthalmos, we know, is the eye symptom to which paralysis of the facial nerve gives rise. It is useful for localisation, inasmuch as it assists in differentiating a lesion in the internal capsule, or in the facial motor centre of the cortex, from one implicating the portio dura in the pons, as it is absent or very slight in the former cases, but very often markedly present in the latter. With a lesion in the lower part of the pons we are apt to have lagophthalmos with crossed hemiplegia, but if the lesion be in the upper part of the pons, the fibres from the opposite side having here joined the motor tract, the hemiplegia and lagophthalmos will be homonymous.

Nystagmus, as a focal symptom, has little localising value. Indeed Nothnagel and Raehlmann agree in the view that it has no such value. It occurs as a distant symptom in many focal, as well as diffuse, cerebral diseases in various situations, but Gowers states that it is "especially common in tumors of the cerebellum."[1]

It will be convenient to refer here briefly to the eye symptoms of localising value afforded by paralysis of the fifth nerve. Similarly as the sixth nerve, crossed paralysis here points. to a lesion in the pons. Moreover, when the nucleus or fibres of the nerve in the pons are diseased, neuroparalytic ophthalmia rarely supervenes: while, if the lesion be basal, the corneal affection is the rule.

The condition of the pupils is rarely of much value in regional diagnosis. Bilateral myosis is often seen with hæmorrhage in the pons, and is usually reckoned amongst the more important symptoms of the lesion; but it is by no means a constant symptom of it, the pupils here being frequently of normal size. Although myosis is most commonly the result

[1] Loc. cit. p. 193.

of pontine lesions, yet it may accompany disease in other parts, as for instance, hæmorrhage in the corpus striatum, which bursts into the lateral ventricle, and in meningeal hæmorrhages. Bilateral mydriasis is frequently present in apoplectic coma, without reference to any particular locality. The same holds good as regards monolateral myosis and mydriasis.

To the monolateral mydriasis, which forms one of the symptoms of paralysis of the third nerve, I shall refer only to point out that this monolateral paralytic mydriasis has greatly assisted in localising a lesion in the cerebral peduncle. Rudolf Arndt has recorded a case[1] in which, among the early symptoms, the most marked were uncertainty and occasional loss of power of both lower extremities, incontinence of urine and of fæces, vomiting, and frequently recurring dilatation of the left pupil, no other branch of the third nerve being at the time affected. The necropsy discovered, as had been foreseen, a tumor in the intrapeduncular space, which pressed more on the left than upon the right peduncle.

Loss of the pupillary reflex to light, apart from cases of paralysis of the third nerve, is a sign of lesion of the anterior quadrigeminal, bodies, or of the optic tracts, and may be utilised to distinguish these lesions from others which may cause loss of sight by implicating both visual paths beyond the corpora quadrigemina, or both visual centres ; for, in such cases, notwithstanding the amaurosis, the pupil reflex is maintained. Gudden's investigations[2] showed that there are special afferent fibres in the optic nerves and tracts for the pupil reflex, distinct from those for vision.

In case of hemianopsia, similarly, the pupil reflex serves to establish a diagnosis between a lesion in an optic tract and one further on in the visual path, or in the visual centre, of the same side; for, if the pupil contracts actively to light concentrated on the blind side of the field, the lesion cannot be in

[1]Archiv f. Psych., iv. 2. p. 432.

[2]Sitzungber. d. Muench. Ges. f. Morphol. u. Physiol. 1886. p. 168.

in the tract; but if it does not react, the lesion must be in the tract. It must be admitted that to decide the presence or absence of this hemiopic pupil is not always a simple matter, owing to the diffusion of the light when thrown into the eye, yet with care it may be obtained, or at least a marked difference in the promptness of reaction of the pupil, according as the light is concentrated more on the seeing or on the blind side of the retina.

And now, as to the second part of my subject—the localising symptoms derivable from the visual apparatus. Of these hemianopsia is one of the most common, as it is one of the most valuable. I may at once dismiss the three forms of hemianopsia which are known as temporal, nasal, and altitudinal, for they are only found with lesions of the chiasma, and provide a means, upon which I need not dilate, of localising those lesions at one or other side, above or below the chiasma. But complete and absolute homonymous lateral hemianopsia is often a symptom of great localising value. It may be caused by a lesion in the cerebral cortex, or by one situated anywhere in the course of the fibres between the cerebral cortex and the optic chiasma; and, by taking concomitant symptoms into account, we are frequently enabled to say in what part of this course the lesion lies.

By complete hemianopsia we, of course, mean, that the defect in the field extends up to the vertical dividing line, and by absolute hemianopsia, a defect which involves each of the three visual perceptions—color, light, and form.

And, first, as regards hemianopsia due to a lesion in the cerebral cortex, a lesion of the visual centre. Pathological anatomy leaves no doubt, but that, in man, the visual centre is situated in the occipital lobe rather than in the angular gyrus or elsewhere, and the evidence goes to show that the absolute optical centre chiefly occupies the cortex of the cuneus and of the superior occipital convolution, and also, especially in respect of the color sense, the posterior part of the superior and inferior occipito-temporal convolutions. The most important evidence to this effect is supplied by four cases pub-

lished respectively by Haab,[1] Huguenin,[2] Féré[3] and Seguin,[4] in which homonymous hemianopsia was present for a length of time before death, and in each of which the only cerebral disease consisted in a circumscribed lesion of the cuneus. Also an interesting case published by Bouveret,[5] in which sudden blindness of both eyes was caused by arterial thrombosis, resulting in softening of a symmetrical region on the mesial surface of each hemisphere, which included the cuneus on each side, and, it is true, a considerable extent of the occipito-temporal convolutions.

Then Berger, and Nothnagel[6] have each observed cases in which the lesion causing hemianopsia was restricted to the superior occipital convolution. Seguin, indeed, would confine the absolute optical centre to the cuneus, but Nothnagel seems to have good grounds for extending it over to the superior occipital convolution as well. Nothnagel points out that in nearly all the cases of extensive lesion of the occipital cortex which gave rise to hemianopsia, the cuneus and the superior occipital convolution were both implicated. He also draws attention to the fact that the middle and inferior occipital convolutions, the lingual and fusiform gyri, may all be disorganised without hemianopsia resulting. He is speaking here of absolute hemianopsia, but he does not discuss hemiachromatopsia, nor the question of separate centres for the three visual perceptions, and Verrey's case of hemiachromatopsia, to which I shall shortly again have to refer, makes it tolerably certain that the centre for the color sense is in the posterior part of the occipito-temporal convolutions.

Yet cases of hemianopsia are on record in which the disease

[1]Monatsbl. f. Augenhlk., 1882, p. 149.

[2]Monatsbl. f. Augenhlk., f. 1882, p. 143.

[3]Quoted by Seguin.

[4]Archives de Neuralgie, 1886, p. 176.

[5]Revue Generale d' Ophthalmologie, Nov. 1887. p. 481.

[1]Verhandlungen des VI. Congresses f. Innere Medicin, 1887.

has attacked one or other or all these parts, and has left the cuneus and superior occipital convolution unscathed. In some of these cases the lesion, no doubt, extended deep enough to involve the optic fibres on their way from the cuneus and superior occipital convolution; but in others it certainly did not do so. For these exceptional cases Nothnagel thinks that, as there is sometimes a departure from the usual anatomical arrangement of the convolutions of the occipital lobe, so, also, there may, in these cases, be an apparent irregularity in the distribution of its functions.

I may here mention that Reinhard[1] inclines to the view that at a point in the superior occipital convolution, close to the intra-parietal fissure, there is a half-vision centre for the macula lutea. Should this prove to be correct, a lesion of the cortical centre for vision which included this spot should always give a hemianopsia, of which the dividing line would pass through the fixation point. These observations of Reinhard's require confirmation, for his paper, being the product of investigations made upon persons of unsound mind, is necessarily unreliable in many particulars. It is especially so as regards the field of vision, for perimetric observations could not be made.

Wilbrand, also, believes that the macula lutea is specially represented in the visual centre.

But, as far as our present knowledge goes, it seems most probable that the view held by Gowers regarding the variations in the dividing line in hemianopic fields is the correct one, namely, that the slight differences with which we are familiar in the position of this line, with reference to the fixation point and to the central vertical line of the field, depend upon slight individual differences in the decussation of the central optic fibres, and have no important localising value.

It would appear, then, that we cannot expect to be able to distinguish clinically between an absolute hemianopsia due to a lesion confined to the absolute visual centre, with or without its efferent fibres, from one due to a lesion involving

[1]Zur Frage der Hirnlocalisation, etc., Arch. f. Psych., Bd. xviii, H. p. 478.

at the same time other parts of the occipital cortex; and this we find to be borne out in practice.

But can we distinguish a complete and absolute hemianopsia, due to a lesion confined to the occipital lobe, from a similar defect in the field, due to a lesion in the optic radiations, internal capsule, pulvinar, or optic tract? We may conclude that the hemianopsia depends upon an occipital lesion, if it be unaccompanied by hemiplegia, motor aphasia, or paralysis of cerebral nerves, as direct symptoms—as might occur with a lesion in the posterior limb of the internal capsule on the left side (*vide infra*;)—but, be it remembered, that one and all of these are liable to accompany lesions of the occipital lobe as distant symptoms.

Aphasia, too, occasionally accompanies right cortical hemianopsia as a direct symptom. It is not easy to offer a satisfactory explanation of this fact, unless we accept Naunyn's view,[1] that there is sometimes a centre for speech in the region where the angular gyrus passes over to the occipital lobe, a region, consequently, very close to the centre for vision. It is also close to the centre for visual memory of words; and hence, aphasia, hemianopsia, and word-blindness—of which more later on—may be found in varying combinations in different cases. The form of aphasia, which Naunyn describes as produced by a lesion in this locality, is not altogether sensory, nor altogether motor, but is an undefined or mixed form. It is, moreover, often caused by a lesion in Broca's lobe, or by one in the centres which usually give sensory aphasia. But in about 40 per cent. of the cases, the lesion producing this undefined aphasia is, according to Naunyn, in neither of these localities, and then this part of the angular gyrus—that long-suffering region—is found to be the most common seat of disease.

Cortical hemianopsia may be a distant symptom. Gowers has observed that, at the onset of many attacks of cerebral hæmorrhage, hemianopsia is present at a distant symptom of very fleeting character, so fleeting indeed that it does not com-

[1]Verhandlungen des VI. Congresses f. Innere Medicin zu Wiesbaden, 1887.

plicate attempts at localisation. Except under this condition, distant hemianopsia seems to be rare, a fact which enhances the localising value of the symptom.

Cortical hemianopsia may be incomplete, but we do not as yet know that a lesion of the visual centre can be so situated as to produce loss of precisely the upper or lower half of the half field; yet the clinicists should bear in mind those interesting experiments made by Schäfer[1] on monkeys, which show that in these animals, as Munk had already proved for dogs, there is a correlation between the parts of the retina and of the occipital lobe. Removal of a certain part of each occipital lobe in the monkey gave rise to loss of the lower part of the field only in each eye. In future cases of incomplete cortical hemianopsia in which necropsies can be obtained, it will be important to note with the greatest possible exactness the precise extent and position of the disease.

So much for absolute hemianopsia. But the lesion may be such as to destroy only the color centre, without reaching those for form and light. Eight cases of hemiachromatopsia are on record.[2] There are also some cases of loss of color-vision in the whole field of each eye with retention of the form and light-senses.[3]

Again, the form-sense may be lost in the half field along with the color-sense, while only the light-sense is retained. Such cases are hardly less rare than the loss of the color-sense alone. Furthermore, cases of hemianopsia are on record[4] in which, in part of the defect, both the color and form-senses

[1]"Experiments on Special Sense Localisation in the Cortex Cerebri of the Monkey," Brain, Parts 39 and 40, January, 1888.

[2]1. Charpentier, Thèse de Paris, 1877 2. Bjerrum. Centralbl. f. Augenheilk., 1881, p. 471. 3. Samelsohn, Centralbl. f. d. Med. Wissensch., 1881. Nos. xlvii and l. 4. Swanzy, Trans. Ophth. Soc. vol. iii, p. 185, 1883. 5. Eperon, Arch. d' Ophthal., Juillet, 1884. 6. Willbrand, loc. cit. 7. Landolt, De la Cécité Verbale, 1888. 8. Verrey, Arch. d' Ophthal., Juillet, 1888.

[3]Wilbrand, Zur Diagnostik der Gehirnkrankheiten, 1884, p. 24; Steffan, Arch. Ophthal., xxvii, 2, p. 11.

[4]Wilbrand, loc. cit.

were absent, but the light-sense present, while in the remainder of the defect all three visual perceptions were lost. In some of these cases partial recovery took place by the light-and form-senses returning, while the color-sense still remained wanting; or, it may be, that the functions which returned had merely played the part of distant symptoms.

Until quite lately we had no necropsy in a case of loss of the color-vision alone. But Dr. Verrey, of Neufchâtel, has been so fortunate as to be able to publish, in the last number of the *Archives d' Ophtalmologie*,[1] a case which practically fulfils these conditions. Dr. Verrey is also to be congratulated upon the good sense which led him to submit his valuable preparation to the skilful handling of Dr. Burkhardt. The patient was a lady, 60 years of age, who consulted Dr. Verrey for a difficulty of sight she experienced in continued reading. This was the result of an apoplectic attack, from which she had rapidly recovered, without any other symptom of which she complained remaining. A perimetric examination showed that there was absolute color-blindness in the whole of the right side of the field of each eye, with diminution, but no absolute loss of the light-and form-senses in the same part of each field. Dr. Verrey considers that the patient's difficulty in reading was due to cerebral asthenopia, and expressly states that she had no dyslexia, properly so-called, nor any word-blindness. He also does not think that the slight diminution in the light-and form-senses in the right side of the field would account for the difficulty in reading which was present. In the course of the following twenty months, during which the patient lived and enjoyed fair general health, Dr. Verrey examined the fields several times, and found them unchanged. Finally the patient succumbed to another apoplectic attack.

The cause of death was found in a fresh hæmorrhage in the right centrum ovale and lateral ventricle; while an old hæmorrhagic cyst, in the lower part of the left occipital lobe, extending into the temporal lobe on the mesial side, explained the

[1] T. vii, No. 4, Juille -Aôut, 1888.

hemiachromatopsia. This cyst was situated between the floor of the posterior horn of the left lateral ventricle and the basal surface of the occipital lobe. It had occupied the white substance of the inferior occipital convolution, and had almost completely destroyed the white substance of the posterior extremity of the occipito-temporal convolutions, as well as that of the postero-inferior part of the cuneus. The cyst came almost to the surface of the cuneus and of the occipito-temporal convolutions, having destroyed the deeper layers of their cortex.

There can, then, be no doubt but that the centres for the color form, and light senses are all present in the occipital lobe and, posterior end of the occipito-temporal convolutions; and it is probable that they are either. as Wilbrand suggests, arranged in layers one over the other in the cortex, or, as others think, they are placed side by side. The latter is the arrangement Dr. Verrey deduces from his case, and he thinks the color-sense occupies the most inferior part of the occipital lobe, and probably the posterior part of the occipital lobe, and probably the posterior part of the lingual and fusiform convolutions of the temporal lobe; while higher, and more towards the superior part of the occipital lobe, is situated the cortical centre for the light-sense; and probably between these two is the centre for the form-sense, for the latter was the function which, after the color-sense, he found most affected. This agrees in the main with the view of Seguin and Nothnagel.

Relative hemianopsia can only occur with lesions of the cortex, hemianopsia from lesions elsewhere must always include all the visual perceptions. Those cases of hemianopsia, also, with some peripheral contraction of the other side of the field, are due to cortical lesions.

Hemianopsia from a lesion in the optic radiations will often be indistinguishable from the same symptom due to a cortical lesion. The defect may be incomplete, as the lesion may implicate only some of the radiating fibres; or it may be complete, if they are all involved. Pronounced distant symptoms, such as hemiplegia, hemianæsthesia, ptosis, and so on, are more apt to be caused by a lesion here than in the cortex.

A lesion in the posterior third of the posterior limb of the internal capsule—the sensory crossway—is likely to produce complete hemianopsia; because the nerve fibres are here collected together in a small space. Hemianæsthesia will be present as an accompanying direct symptom: and also, sometimes, loss of the other special senses on the opposite side from the lesion; and, should the disease extend forwards to the anterior part of the posterior limb, hemiplegia will be added as a direct symptom. Moreover, if the lesion be on the left side, motor aphasia may be present, by reason of the proximity of the path for speech on its way to the cerebral peduncle. I have already spoken of the combination of cortical hemianopsia with aphasia.

There are a few cases on record of hemianopsia caused by a lesion in the pulvinar. The symptoms in such cases strongly simulate those present in many cases of cortical hemianopsia, so that a differential localisation as regards these two positions may be impossible. The hemianopsia will be absolute, and probably complete; but lesions just in this situation seem to be very rare.

In hemianopsia due to a lesion of the optic tract the defect in the field is usually complete. The characteristic sign which enables us to localise a lesion in this position from one elsewhere causing hemianopsia is the hemiopic pupil already described.

Two cases may be mentioned which exemplify the peculiar service this pupil-symptom is sometimes capable of rendering. One of these—interesting, too, for other reasons—is published by Brandenburg in the last volume of Graefe's *Archiv*.[1] In the right eye there was a hemiopic defect of the field to the right side. But the field in the left eye could not be examined, owing to complete leucoma of the cornea. The defect in the right field, therefore, might have been the representative of a bitemporal hemianopsia due to a lesion at the chiasma, in so far as the perimeter could decide. The absence of the hemi-

[1] Bd. xxxiii, 3, p. 93.

opic pupil it was which showed that the lesion was not at the chiasma, and, no doubt, if the field of the left eye could have been examined, a homonymous defect would have been found in it.

The other case, observed by Brieger, is quoted by Wernicke.[1] In it there was complete blindness of both eyes, and, as the pupil in a general way reacted to light, a diagnosis of double hemianopsia due to lesions of both occipital lobes was made. At the necropsy only the right occipital lobe was found diseased, while the left occipital lobe was healthy; consequently, the left-sided hemianopsia alone was so far accounted for. But the cause of the right-sided hemianopsia was soon discovered. In consisted in a degeneration of the left optic tract. If, then, during life the pupillary reaction had been more carefully examined, the existence of two lesions, one in the left tract and the other on the right side, beyond or higher than the tract of that side, could have been diagnosed; for the pupillary reflex would have been found wanting or defective if light had been concentrated on the left half of one or other retina.

Lesions of the optic tract are, of course apt to implicate the crus cerebri, but do not necessarily do so. Leber has pointed out that atrophy of the optic nerve is likely to make its appearance and at an early stage of the case, in lesions of the tract.

Total blindness of both eyes, when it appears as a focal symptom—apart from such cases of double cortical hemianopsia, or of cortical hemianopsia combined with a lesion of the opposite optic tract, as I have already referred to—can only be due to a lesion involving the whole of the chiasma, or of both optic tracts. The great mass of clinical evidence is opposed to the idea that lesions of the corpora quadrigemina produce blindness.

I must now ask you to return with me for a moment to the occipital lobe. Visual auræ have sometimes been noted as a

[1]Loc. cit., Bd. iii, p. 335.

symptom of disease of this lobe. Gowers has recorded a case[1] in which flashes of light were seen before both eyes, but especially before the left eye, and in which the necropsy discovered a sarcomatous tumor occupying the first and second occipital convolutions, the posterior half of the superior and inferior parietal lobes, and, on the mesial surface, the cuneus and the præcuneus. Other authors, too, have recorded occipital tumors with similar symptoms.

A very remarkable visual defect is that known as mind-blindness, or loss of visual memory—blindness, we may say, of what has long been known as "the mind's eye." Sight in the ordinary sense of the word—the reception of the retinal images by the visual centre—is unimpaired, but the psychical realisation of the retinal images is not effected. The objects are seen, but the sight of them suggests no corresponding idea in the patient's mind.

We are acquainted with several varieties or degrees of this symptom. In a well-marked case the patient may be unable to recognise the streets of the city in which he has been resident for many years, and will feel as if in a strange place; he may not know his own hall door. He may be unable to distinguish his wife from his mother, and his children may appear as strangers to him. He will be unable, when away from them, to recall to his mind's eye the appearance of the places and people that have been familiar to him all his life. Yet such a man will be perfectly capable, so far as his other intellectual faculties are concerned, of transacting business, and of entering into the enjoyments of life.

In a case which I brought before this Society five years ago; mind-blindness of a partial character was one of the symptoms, although at the time I did not sufficiently direct attention to it; for I did not myself understand its significance. The case is recorded in our *Transactions*[2] as one of hemiachromatopsia, but it was partial mind-blindness which brought the gentle-

[1] Lancet, 1879, Vol. 1, p. 363.

[2] Loc. cit.

man, aged 77, to me. Five months previously he had had a slight apoplectic attack, and he came complaining that ever since then he could not see people properly, although he saw everything else as plainly as ever. Then he expressed himself differently, and said he did see people indeed, but did not know them, even when near to them. His own wife he would pass in the street, and if she stopped him, he would look straight in her face, she told me, without any expression of recognition in his until she spoke, and he then at once knew who it was. He said that although he saw me at that moment quite plainly, yet if he met me unexpectedly five minutes later, my appearance would be as new to him as though he had never seen me before; but he always identified people when they spoke. He was hypermetropic 1.5 dioptries, and had an acuteness of vision of $^{6}/_{XII}$. With the exception of some peripheral cataract, his eyes were organically sound. In the course of the functional examination I discovered the hemiachromatopsia, which afterwards formed the main subject of my communication, although in my paper I did mention his difficulty of recognising people, and stated that I regarded it as a disturbance of a cerebral function. In addition to the difficulty of recognising well-known faces, the patient only complained of a confusion of ideas, when he made an unwonted mental effort. He did not tell me anything about color-blindness, until he saw that I was going to test the color-sense, and then he said he had found it most difficult to distinguish colors since his attack.

Mind-blindness is seen in cases of general paralysis, usually in the advanced stages. In one case under Wernicke's care[1], and which was examined by Schweigger—where the symptoms came on at an early stage, the patient's intelligence being still good—the remarkable circumstance was noted that, with good acuteness of vision, and without any absolute defect in the field, there were, disseminated over a great portion of the field, a number of relative scotomata, within the area of any

[1]Loc. cit., Bd. iii, p. 552.

one of which, although objects could be seen by the patient, yet he could not recognize them, could not tell what they were. The same objects in other parts of the field he was able, not only to see, but also to recognize. The region of the macula lutea did not correspond to one of these scotomata. Wernicke regrets that the color-vision in the scotomata was not tested, and it would, indeed, have been interesting to know what its condition there may have been.

The position of the cortical centre for visual memory is still a subject of discussion. Hitherto all the necropsies have been made in cases of general paralysis, and for definite knowledge we must wait for the post-mortem examination of a case in which the symptom has been caused by cerebral hæmorrhage. Nothnagel, Wernicke, Wilbrand, and some other writers assign this function to all, or to most, of that part of the occipital cortex which does not form the centre of vision. Gowers thinks it is either in the anterior part of the occipital lobes, or in the posterior part of the parietal lobes; but the latter, he believes, is the more probable. The curious and interesting fact that, in Charcot's case, in a case recorded by Quaglino, in one by Landolt, and in my own case, a derangement of the color-sense came on simultaneously with mind-blindness seems strong evidence in favor of a localisation of visual memory very close to the visual centre. My case is, perhaps, of special importance in this connection, as the lesion was evidently of slight extent. Cases, too, are on record in which absolute hemianopsia accompanied mind-blindness. I should, therefore, be inclined, in the absence of a conclusive necropsy, to localize this function very close to the centre for vision, probably in the occipito-temporal lobe.

Gowers thinks that when mind-blindness results from disease of one hemisphere, it is probably transient; but my case, where the lesion was evidently in the right hemisphere, and where, even when I first saw the patient, the symptoms had lasted five months, does not support this view.

It would seem that mind-blindness may be a distant symptom, for Wilbrand records a case in which it appeared to have only this significance.

I must here refer to a case reported by Dr. Macewen, of Glasgow, in his remarkable address on "The Surgery of the Brain and Spinal Cord," delivered at the last meeting of the British Medical Association.[1] A man, who had received an injury about a year previously, suffered from deep melancholy and strong homicidal impulses, which were relieved by paroxysms of pain in the head of indefinite seat. The only localising symptom Dr. Macewen could obtain was mind-blindness, which had been present immediately after the accident, and for about two weeks subsequently. On operation, the angular gyrus was exposed, and it was found that a portion of the internal table of the skull had been detached from the outer, and had exercised pressure on the posterior portion of the supra-marginal convolution, while a corner of it had penetrated and lay imbedded in the anterior portion of the angular gyrus. The bone was removed from the brain and reimplanted in proper position, after which the patient became greatly relieved in his mental state, though still excitable.

Dr. Macewen thinks that the definite localization in this case will assist in indicating, in man, what function the anterior portion of the angular gyrus and the posterior portion of the supra-marginal convolution subserve. The brilliant result obtained places the case almost beyond the region of any criticism; and yet I cannot help expressing the view that Dr. Macewen ventured a good deal here in adopting the mind-blindness as a localising symptom. The fact that it was present immediately after the accident for only a fortnight, although in marked degree, would raise a strong suspicion that the mind-blindness may have been a distant symptom, and nothing more. Again, I do not quite agree with Dr. Macewen in thinking his case conclusive as to the function of the injured convolutions. If visual memory be their function, why was it so completely destroyed in the first fortnight during which the lesion existed, and completely restored from that time on, although the lesion remained for a year afterwards? The cen-

[1] Journal, Aug. 11, 1888.

tre for visual memory may, indeed, reside in the angular gyrus; but I hardly think Dr. Macewen's interesting case can be taken as a proof that it does reside there.

Word-blindness, or alexia—loss of the power of understanding printed or written speech-symbols—is held by many to be nothing more than partial mind-blindness. Gowers, Wernicke and Wilbrand are of this opinion, and all these authors, as well as Ferrier and Broadbent, localize the lesions which produce the symptom in the angular gyrus of the left hemisphere. Nothnagel,[1] while he localises the centre for visual speech-symbols in this same region, dissents from the view that word-blindness is to be included in mind-blindness; and the fact that in some well-marked cases of mind-blindness there was no word-blindness might seem to support this view. But, if the centre for visual memory of every kind, except that for printed and written speech symbols, is situated in the occipital lobe, as Nothnagel himself holds, there is no reason why word-blindness should accompany mind-blindness, unless in those cases in which the lesion extends to the angular gyrus. The fact that word-blindness may exist without mind-blindness is, for a similar reason, no argument in favor of Nothnagel's opinion.

A good many cases of alexia with right hemianopsia have been recorded, and a natural explanation of this combination of symptoms is supplied by the proximity of the centre for vision to the angular gyrus. Indeed, some authors go so far as to state that hemianopsia is present in all cases of word-blindness. It is interesting to note that there is one case, reported by Dr. Borel,[2] in which, in a right-handed person, word-blindness along with mind-blindness accompanied left hemianopsia. And Landolt[3] has placed on record a case of right hemiachromatopsia in which there was word-blindness.

I may be permitted to briefly refer to a peculiar variety of

[1]Verhandlungen des VI. Congresses f. Innere Medicin zu Wiesbaden, 1887.

[2]Landolt, loc. cit.

alexia which has been seen in two cases, although we cannot at present utilize it for the purpose of localisation. One of these is reported by Brandenburg[1]. The patient, who was also affected with right homonymous hemianopsia, was unable to read any printed or written letters or words, yet he could read off with ease long numbers reaching to tens of thousands in Arabic characters. In the second case—quoted by Brandenburg—Joly[2] observed the same power of reading Arabic numbers, while the power of reading words and letters was lost.

I do not know that alexia has been seen as a distant symptom.

The remarkable symptom termed dyslexia was first described by Berlin.[3] He has observed it in six cases, and Nieden[4] and Bruns[5] have each recorded one case of it. The patient is unable to read more than a very few words consecutively, either aloud or to himself, owing to a feeling of dislike or disgust which suddenly invades him, and which he cannot overcome. After he has read a few words, which he can understand well, he pushes the book away or hands it to the surgeon, while he draws his head back, and turns it aside. After a brief interval the attempt may be renewed, but with the same result, when a few words have been read. There is no dimness of sight, defect of accommodation, or pain in the eyes or head to account for the symptom. It usually comes on suddenly, and is the first sign of serious cerebral disease, being soon followed by other symptoms, such as headache, giddiness, aphasia, hemianopsia, hemiplegia and so on. All of these cases have ended fatally. The details of the necropsies, in those cases where they were obtained, leave much to be desired. In every instance the lesion was on the left side of

[1]Loc. cit:

[2]Amnesie et Cécité verbale, Le Scalpel, 1883, No. 24, p. 147.

[3]Arch. f. Psych., Bd. xv., p. 276, and in his monograph: Eine besondere Art der Wortblindheit, Dyslexia, Wiesbaden, 1887.

[4]Arch. f. Augenhlk., Bd. xviii., p. 162.

[5]Neurolog. Centralbl., Nos. 2 and 3, 1888.

the brain, the patients being all right-handed. The disease seems to have occupied chiefly the inferior parietal lobule, extending sometimes as far forward as the inferior frontal convolution, and sometimes as far backward as the angular gyrus. It is evident, however, that we must be content to wait for more definite information with regard to the usual seat of the lesion, before this symptom can be utilized in practice for the purposes of localisation.

In crossed amblyopia—in which the eye on the side away from the cerebral lesion is almost blind, with very contracted field, while the field of the other eye is also contracted, but in a less degree—the lesion has been found in the lower and hinder part of the inferior parietal lobule.

I must mention that so distinguished an author as Nothnagel, writing about a year ago,[1] expressed his doubt as to the occurrence of crossed amblyopia. He does not think the perimetric examinations have been made in these cases with care sufficient to exclude the possibility of their being examples of incomplete hemianopsia. Nothnagel does not offer any experience of his own, and I am slow to think that observers like Ferrier, Gowers and Sharkey could fall into such error.

In conclusion, with reference to optic neuritis, it is merely necessary to state that it has practically no localizing value; nor should I think it is necessary even to do this much but that, in some recent cases of brain surgery, it seems to have been tried to utilize the optic neuritis for localisation. Optic neuritis occurs in most cases of intra-cerebral tumor, irrespective of the seat of the disease.

And now, gentlemen, I have come to the end of this lecture, and have not as yet made any reference to that distinguished man in whose honor I have the honor to address you. But I do not believe you could wish that we should separate this evening without your having heard from me some expression of the esteem in which we hold Sir William Bowman, nor will I be guilty of such an omission. And here I might dwell upon

[1]Congress fuer Innere Medicin, Wiesbaden, 1887.

Bowman's scientific attainments, upon the good work he did in years gone by—not alone in ophthalmology, but also in physiology—upon all this Society owes to his prestige and to his generosity, upon his clinical knowledge and operative skill, and upon many another topic which his name suggests. But I prefer to remind you of the high standard of professional life he has shown us, a standard which we of a younger generation must endeavor to maintain. Conscientious in his relations with his patients, honorable in his relations with his professional brethren, careful not to put himself forward in any unrecognized manner, not seeking notoriety, simple, kind, courteous, dignified, William Bowman is presented to our mind's eye as the personification of the best of those qualities which go to make an English gentleman. We are indeed privileged in being permitted during his lifetime to offer some tribute to his distinguished scientific merit; but, while recognizing how much we owe him scientifically, I think, and I believe you will admit, we should not forget how much his every-day professional life has tended to give to the noble specialty he adorns that high tone which belongs to it. Our sincere hope is that Sir William Bowman may long live to enjoy the honor conferred on him by his Queen, the love of those who are dearest to him, and the warm, heart-felt esteem of this Society.—*British Medical Journal*

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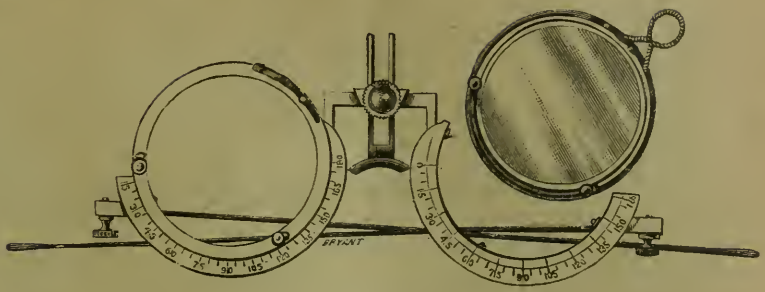
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